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U.S. Department of the Interior
Bureau of Land Management

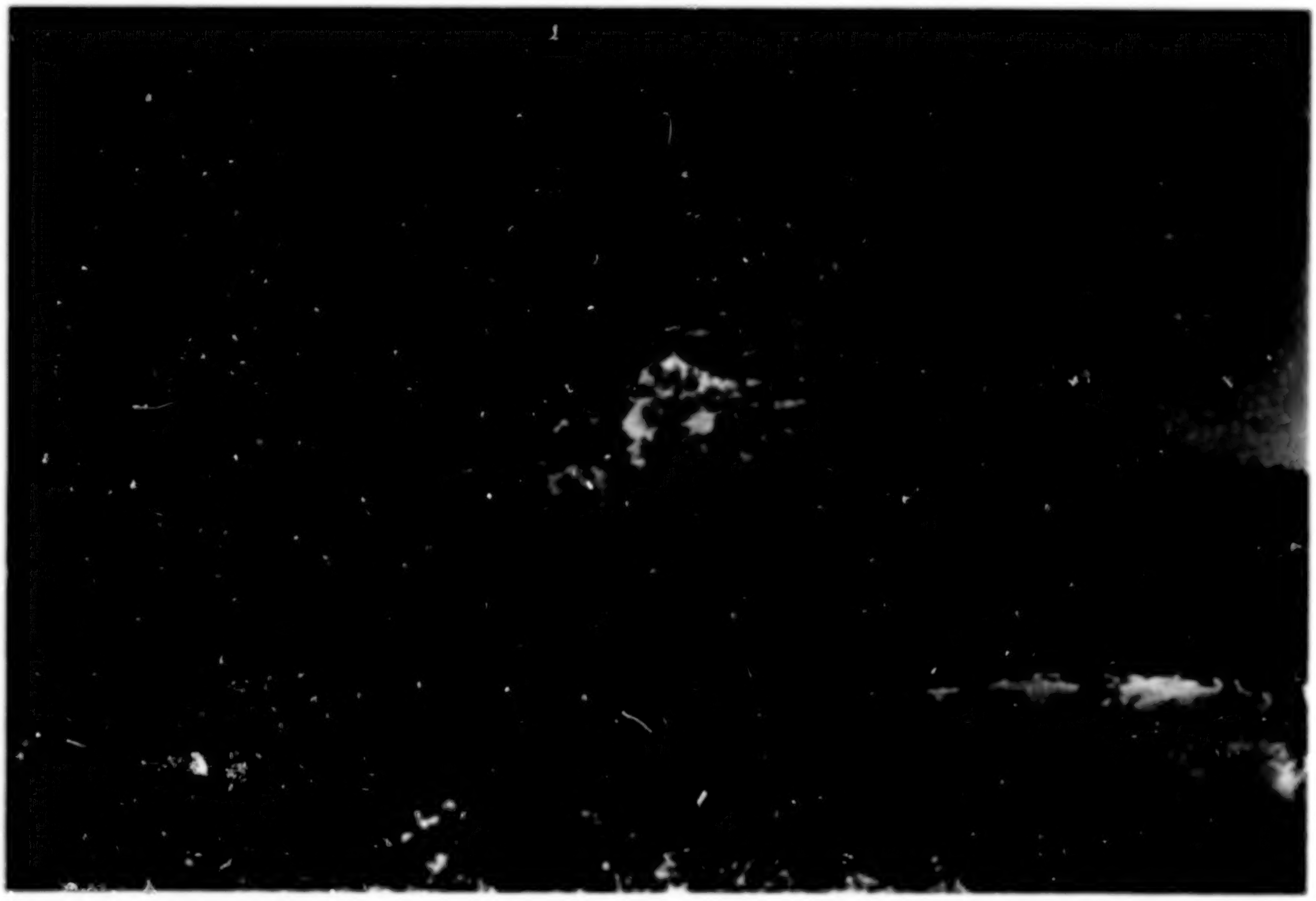
Medford District Office
3040 Biddle Road
Medford, Oregon 97504

March 2000

Cascade Siskiyou Ecological Emphasis Area

Draft Management Plan/ Environmental Impact Statement

Volume II



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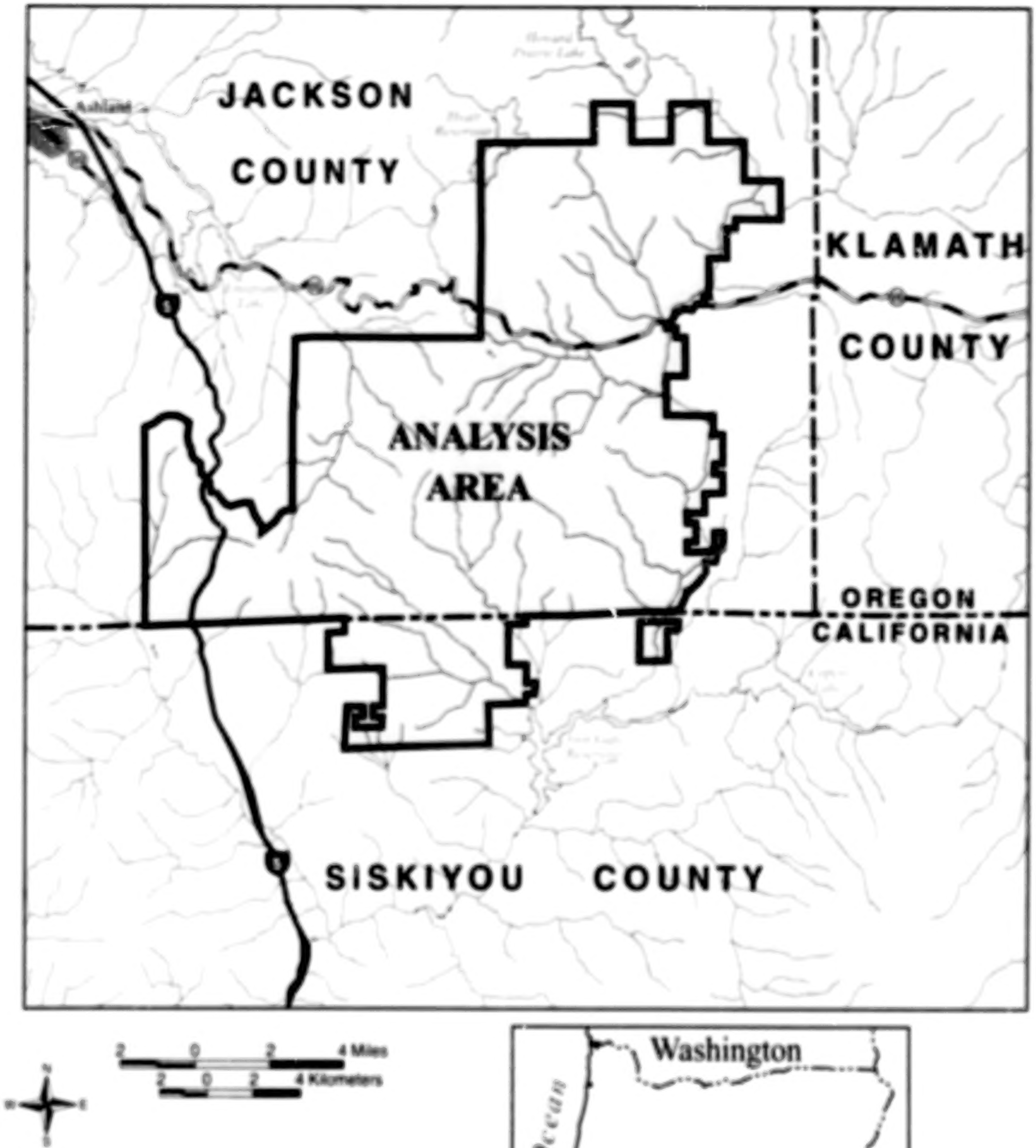
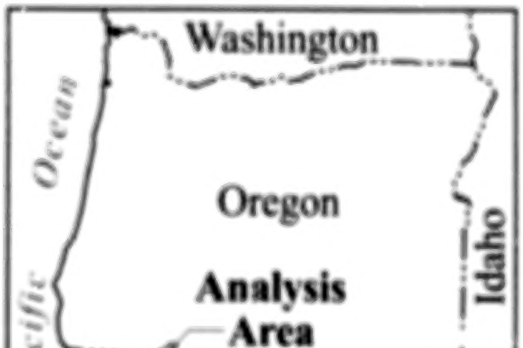
As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

BLM/OR/WA/PL-00/0017+1792

Cascade Siskiyou Ecological Emphasis Area
Anaysis Area Location





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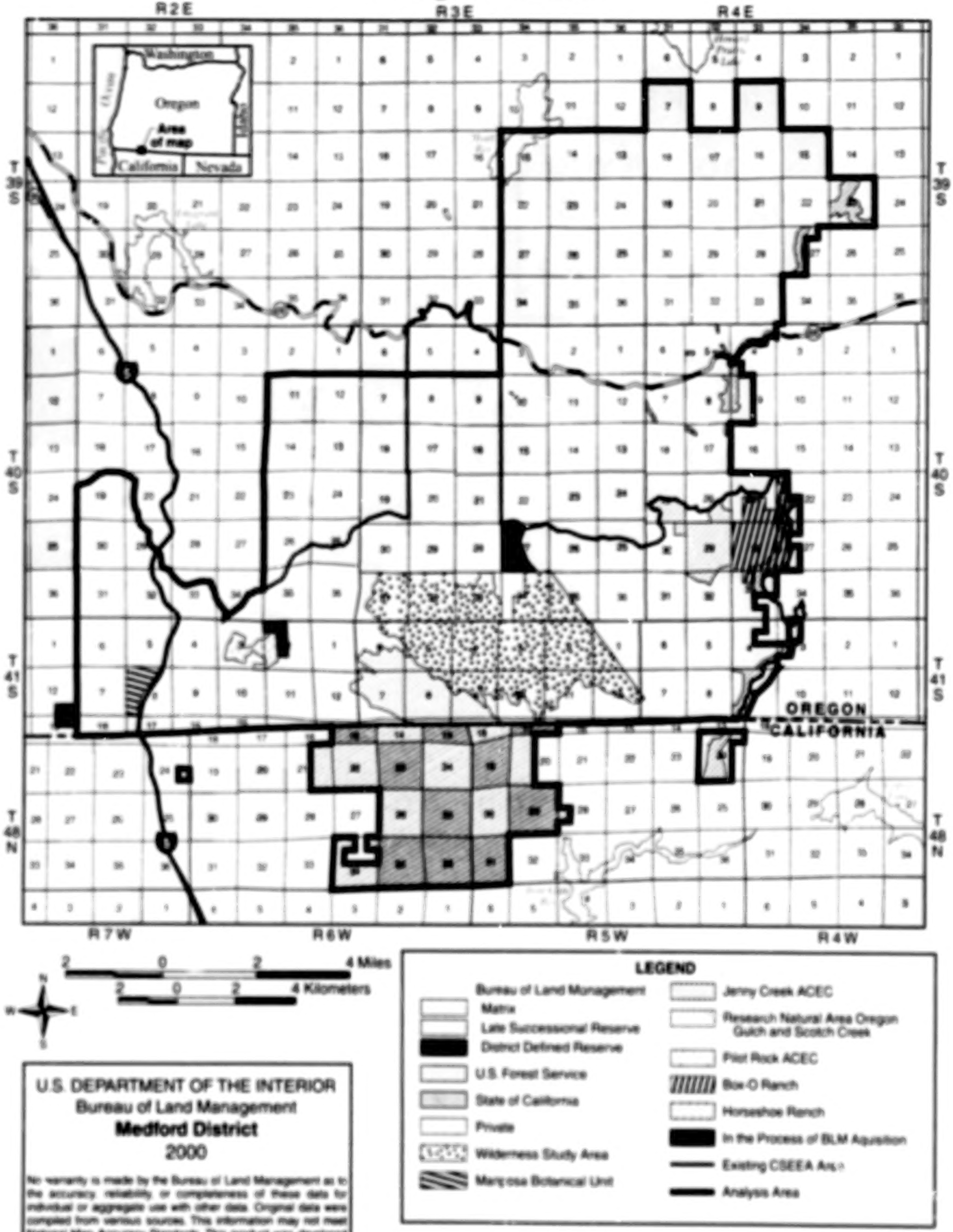
MAP 1

[illegible]

Cascade Siskiyou Ecological Emphasis Area
Existing Environment



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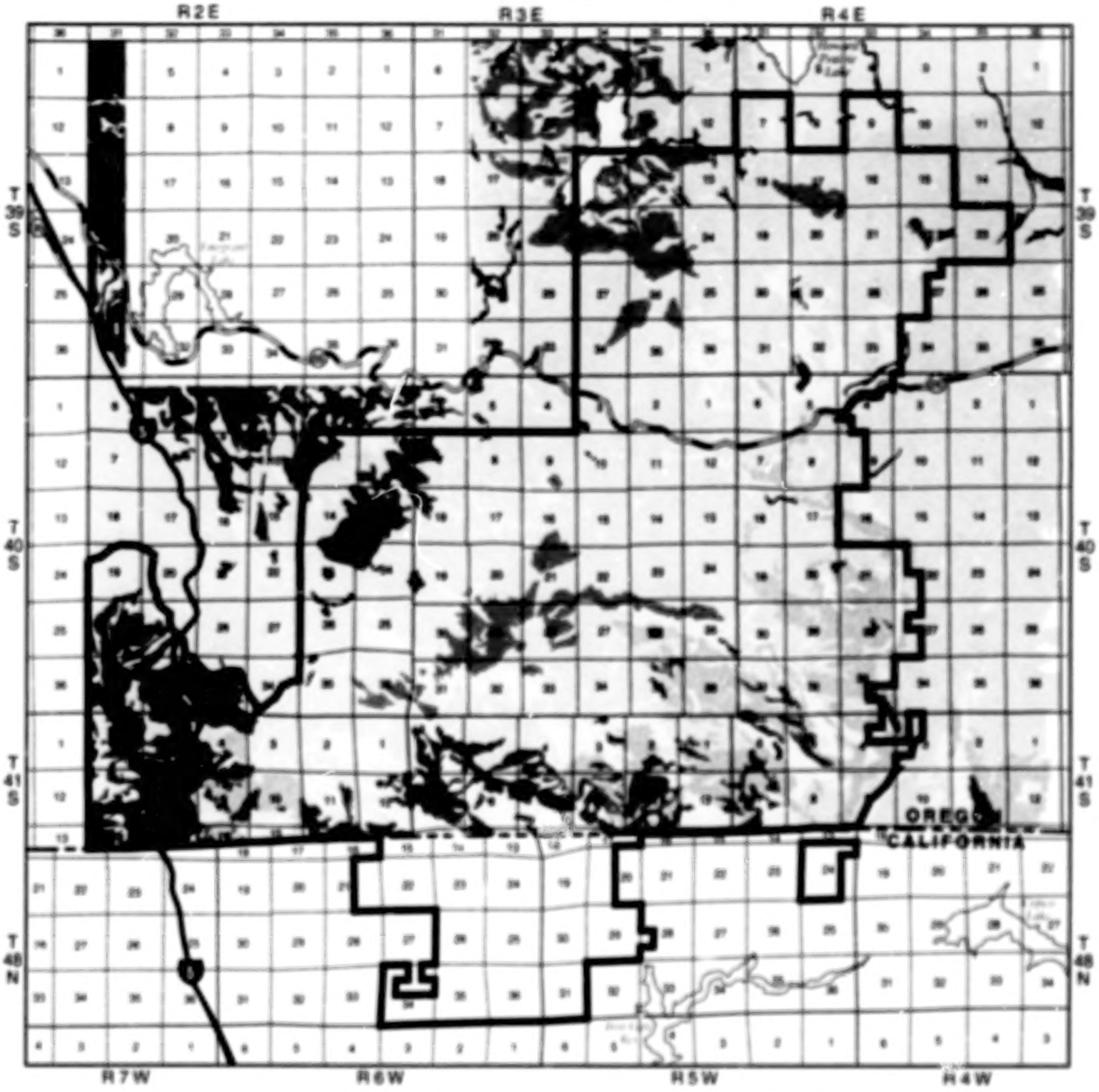
MAP 2

061-03-2000 JR

Cascade Siskiyou Ecological Emphasis Area
Distribution of Plant Communities

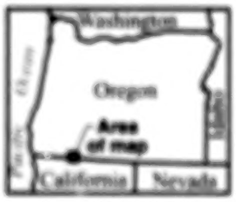


LEGEND

Plant Communities

- ☐ Grassland/Meadow
- ▨ Shrub/Woodland
- ■ Hardwoodland
- ▨ Mixed Conifer
- ▨ White Fir
- ■ Semi-Wetland
- ■ Wetland
- ☐ Open Water
- ☐ No Data Currently Available

▬ Analysis Area



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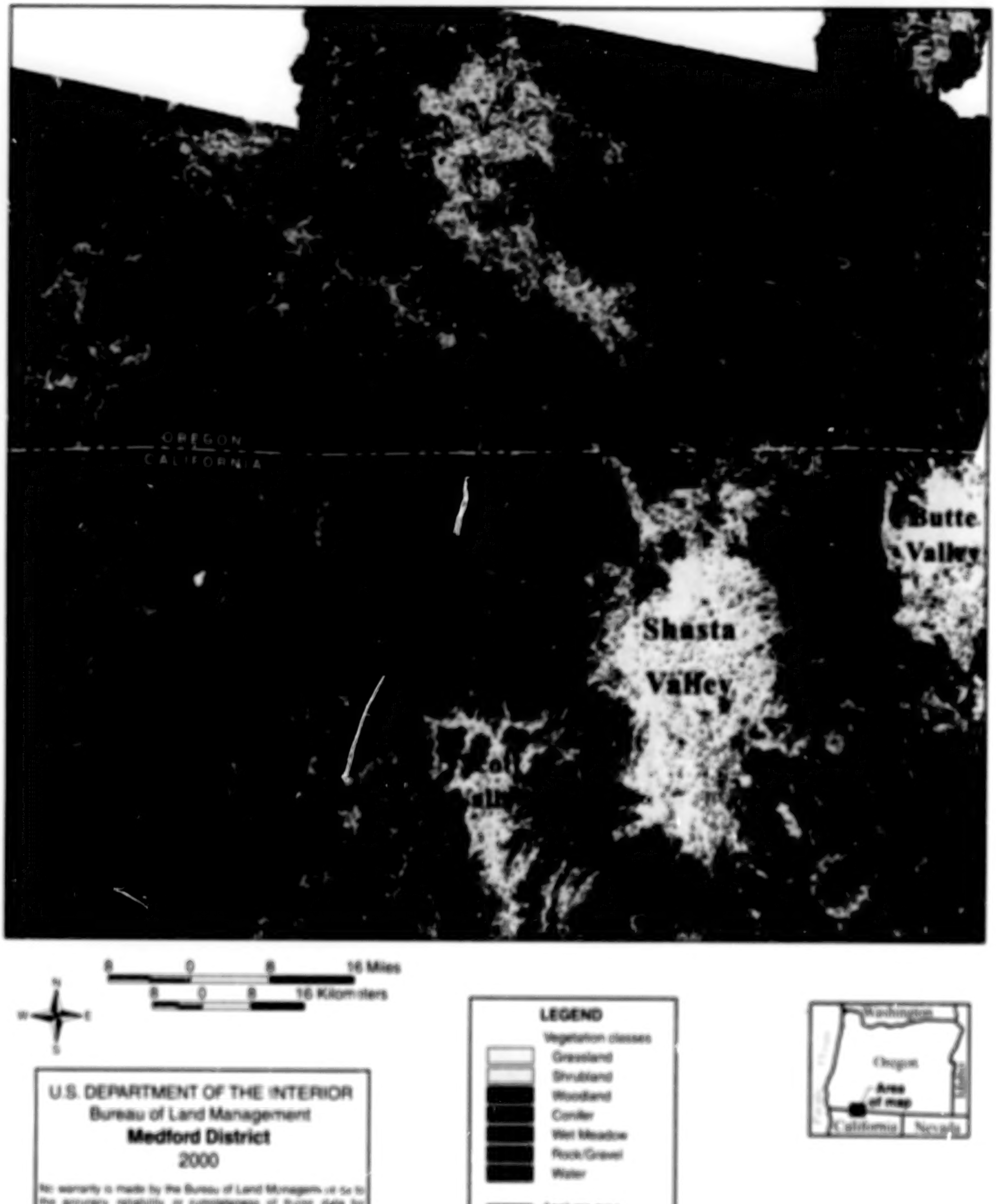
MAP 3

001-03-2000 JR

3

Satelite Imagery of Coarse Plant Communities of Northern California and Southern Oregon



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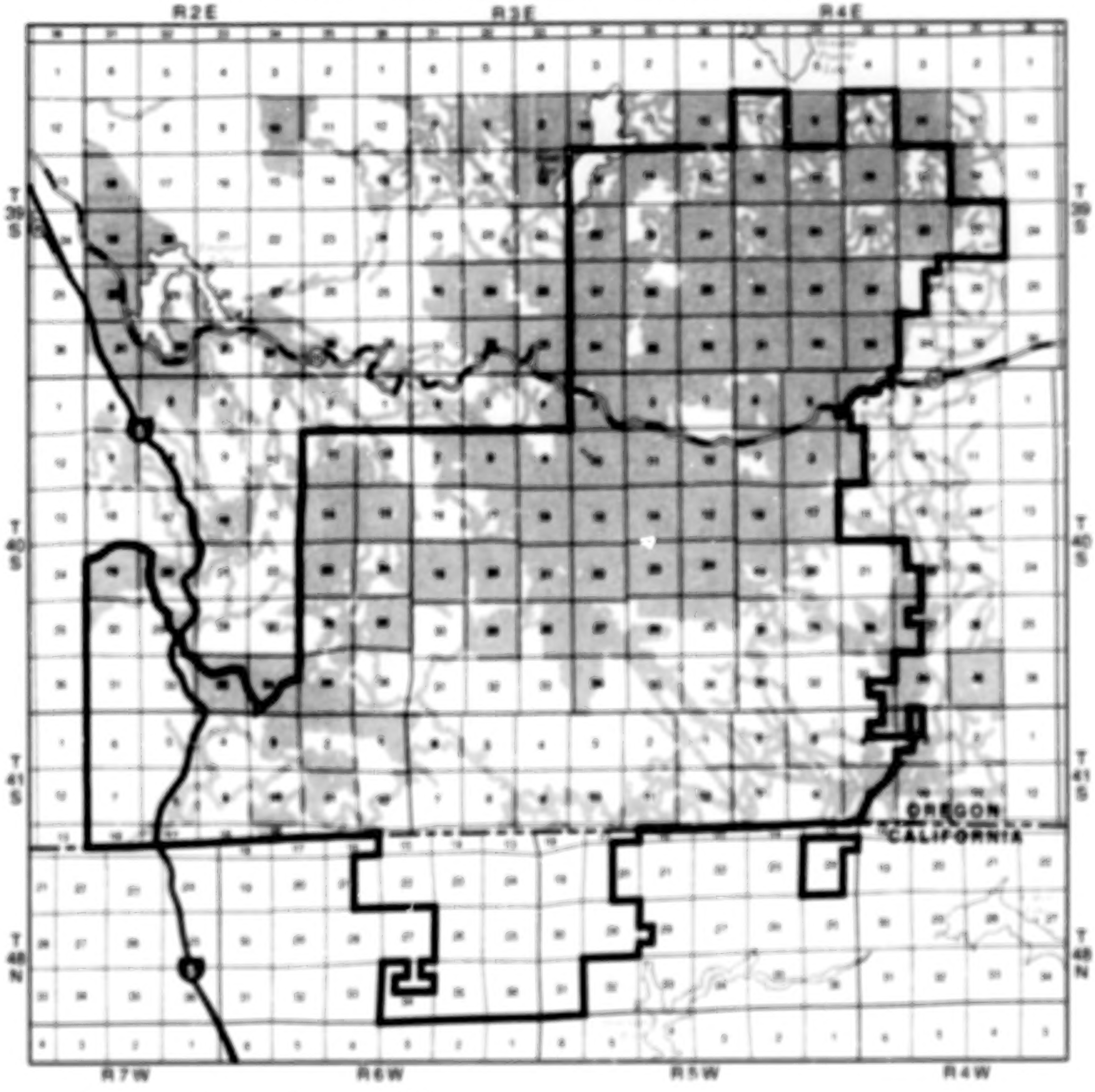
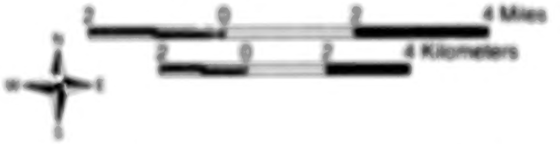
MAP 4

091-03-2000 JR

Cascade Siskiyou Ecological Emphasis Area
Acute Surface Disturbance within the CSEEA

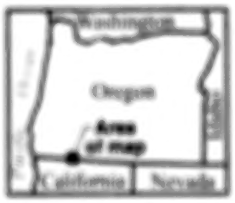




LEGEND

▨ Cumulative Surface Disturbance
No Data Currently Available in California

━ Analysis Area



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MAP 5

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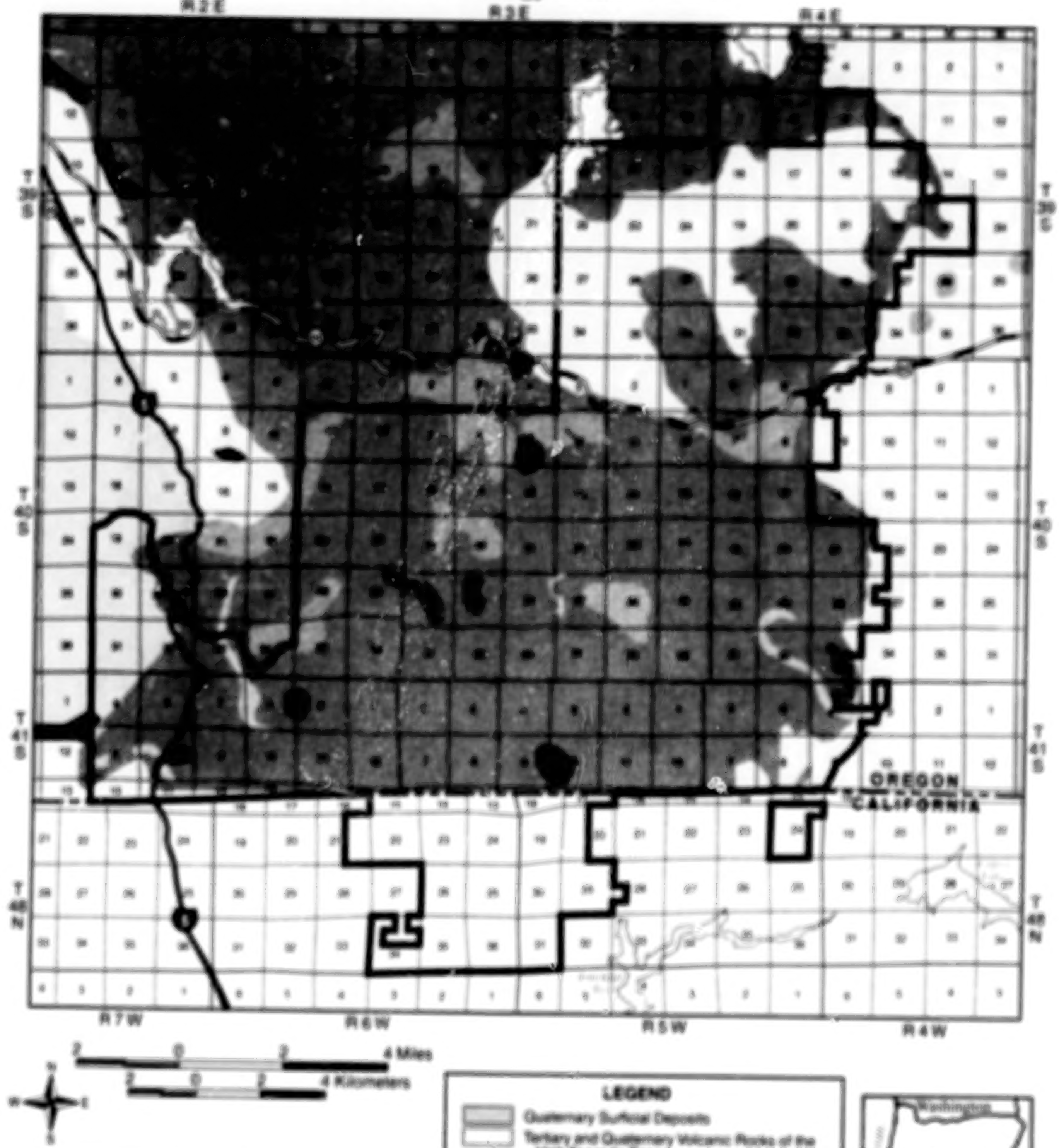
5

Cascade Siskiyou Ecological Emphasis Area
General Geology of the CSEEA

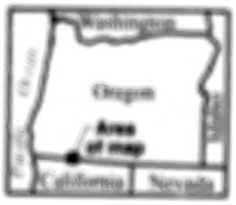


LEGEND

- ▨ Quaternary Surficial Deposits
- ☐ Tertiary and Quaternary Volcanic Rocks of the High Cascade Range
- ▨ Tertiary Volcanic Rocks of the Western Cascade Range
- ■ Intrusive Rocks
- ▨ Ash Flow Tuff
- ▨ Eocene Sedimentary Rocks
- ☐ Late Cretaceous Hornbrook Formation Sedimentary Marine
- ☐ Jurassic Granitic Plutonic Rocks (Ashland Pluton)

No Data Currently Available in California

━ Analysis Area



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MAP 6

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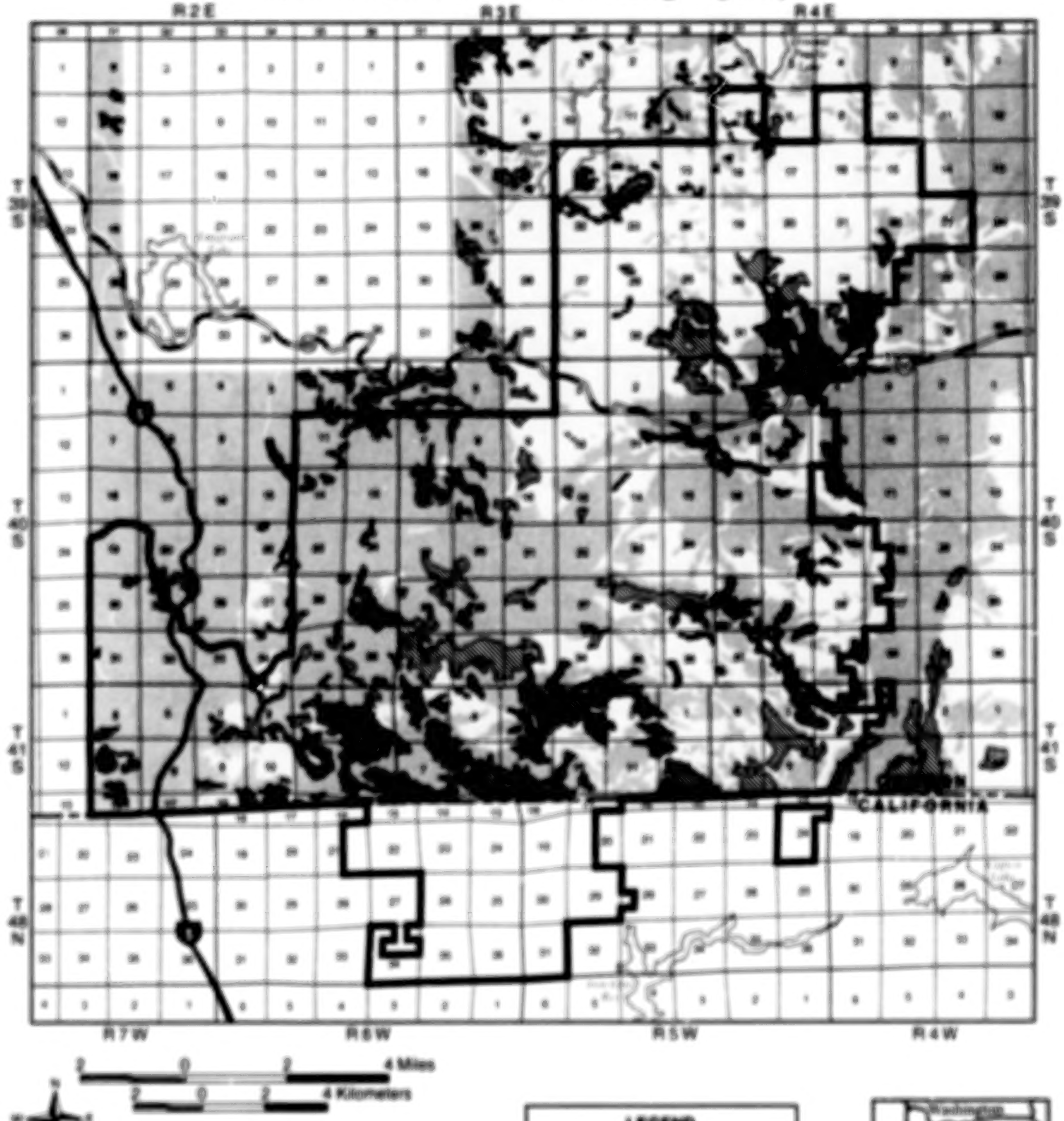
Cascade Siskiyou Ecological Emphasis Area
Soils with Limited Water Holding Capacity



LEGEND

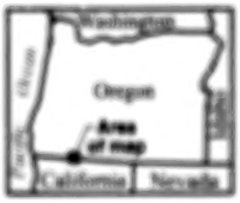
▨ Lithic Soils

Non-Skeletal/Skeletal Soils

- ▒ Non-Skeletal
- ☐ Skeletal

☐ No Data Currently Available

▬ Analysis Area



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MAP 7

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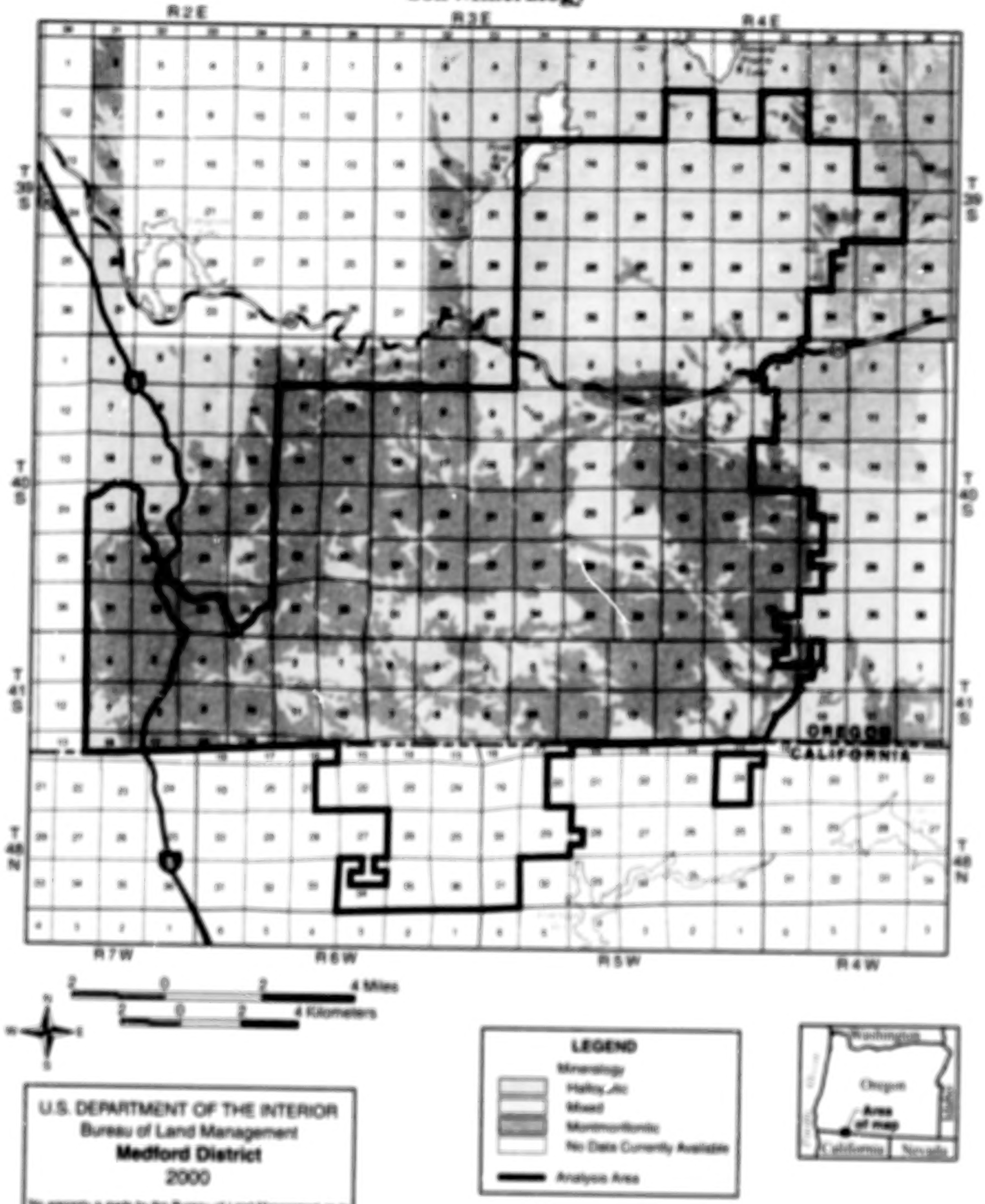
Cascade Siskiyou Ecological Emphasis Area
Soil Mineralogy



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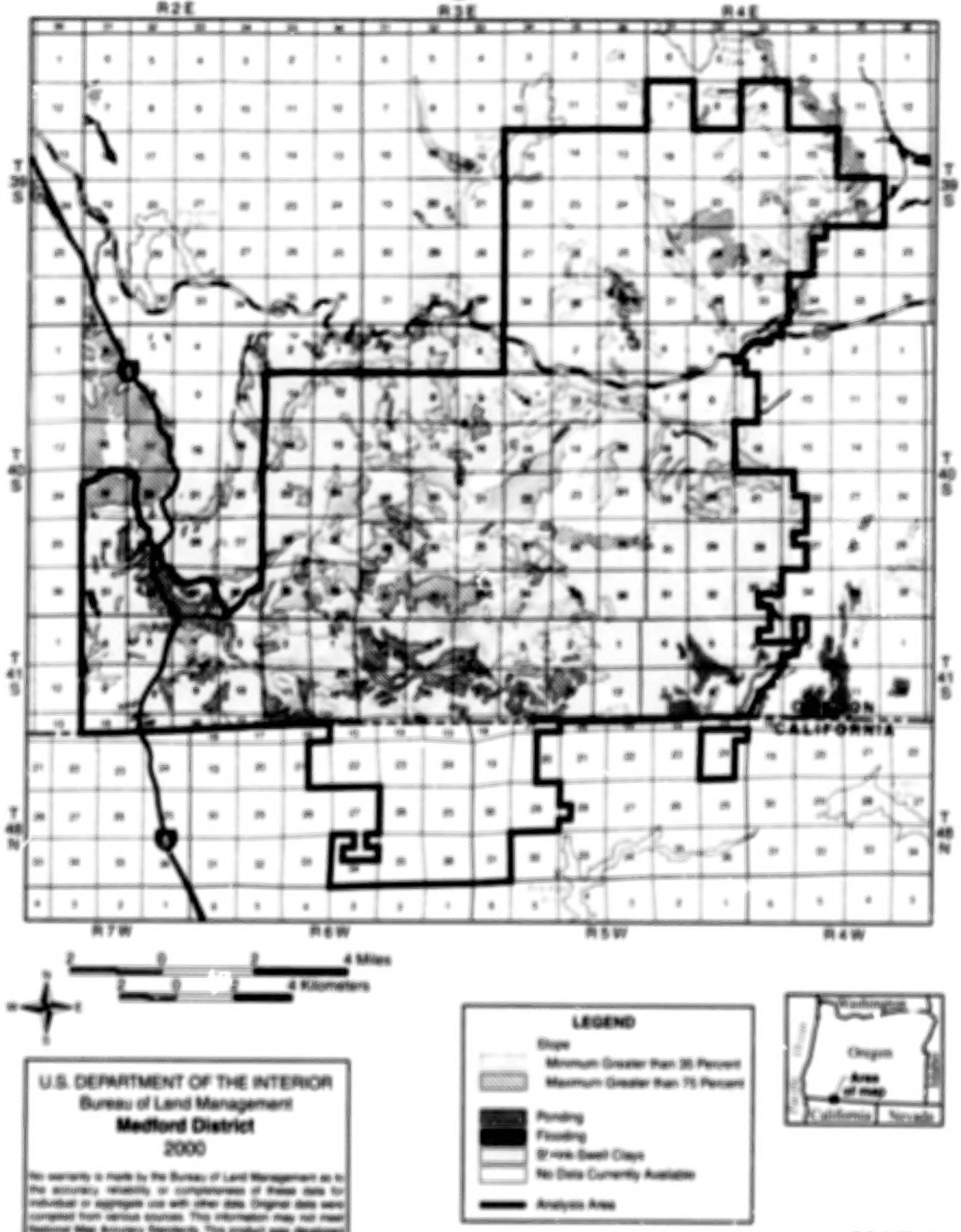
MAP 8

8

Cascade Siskiyou Ecological Emphasis Area
Fragile Soils



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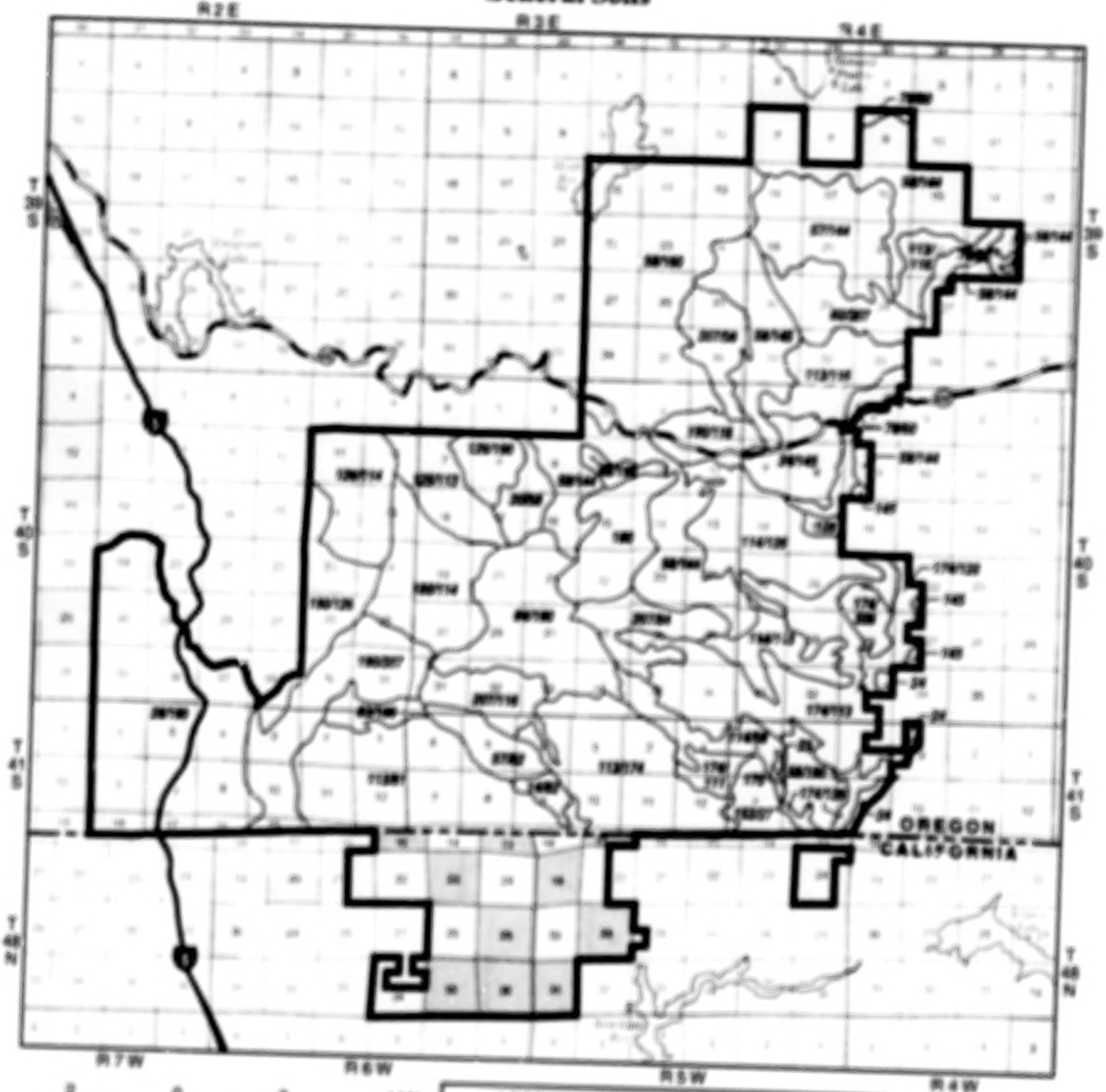
MAP 9

Cascade Siskiyou Ecological Emphasis Area
General Soils

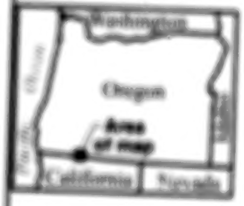


LEGEND

- Soil Unit Boundary
- **180/114** Soil Conservation Service Number (primary/secondary)
- *No Data Currently Available in California*
- ☐ Bureau of Land Management
- ☐ U.S. Forest Service
- ▨ State of California
- ☐ Private
- ▬ Analysis Area

General Soil Unit

13 Bogus Very Gravelly Loam
16 Bybee Loam
20 Bybee-Tatouche Complex
23 Campfour-Paragon Complex
27 Carney Clay
28 Carney Cobbly Clay
59 Farva Very Cobbly Loam
60 Farva-Rock Outcrop Complex
70 Greystoke Stony Loam
81 Heppsie Clay
82 Heppsie-McMullin Complex
85 Hobit Loam
96 Kanutchan Clay
113 McMullin-Rock Outcrop Complex
115 McNull Loam
119 McNull-McMullin Complex
120 Medco-McMullin Complex
125 McNull-Medco Complex
128 Medford Clay Loam, Gravelly Substratum
140 Pinehurst Loam
145 Pinehurst-Greystoke Complex
152 Randcore-Shoat Complex
160 Rustlerpeak Gravelly Loam
167 Sibannac Silt Loam
170 Skookum Very Cobbly Loam
173 Skookum-Rock Outcrop-McMullin Complex
180 Steinmetz Sandy Loam
190 Tatouche Gravelly Loam
207 Woodseye-Rock Outcrop Complex
208 Xerumbrepts-Rubble Complex



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MAP 10

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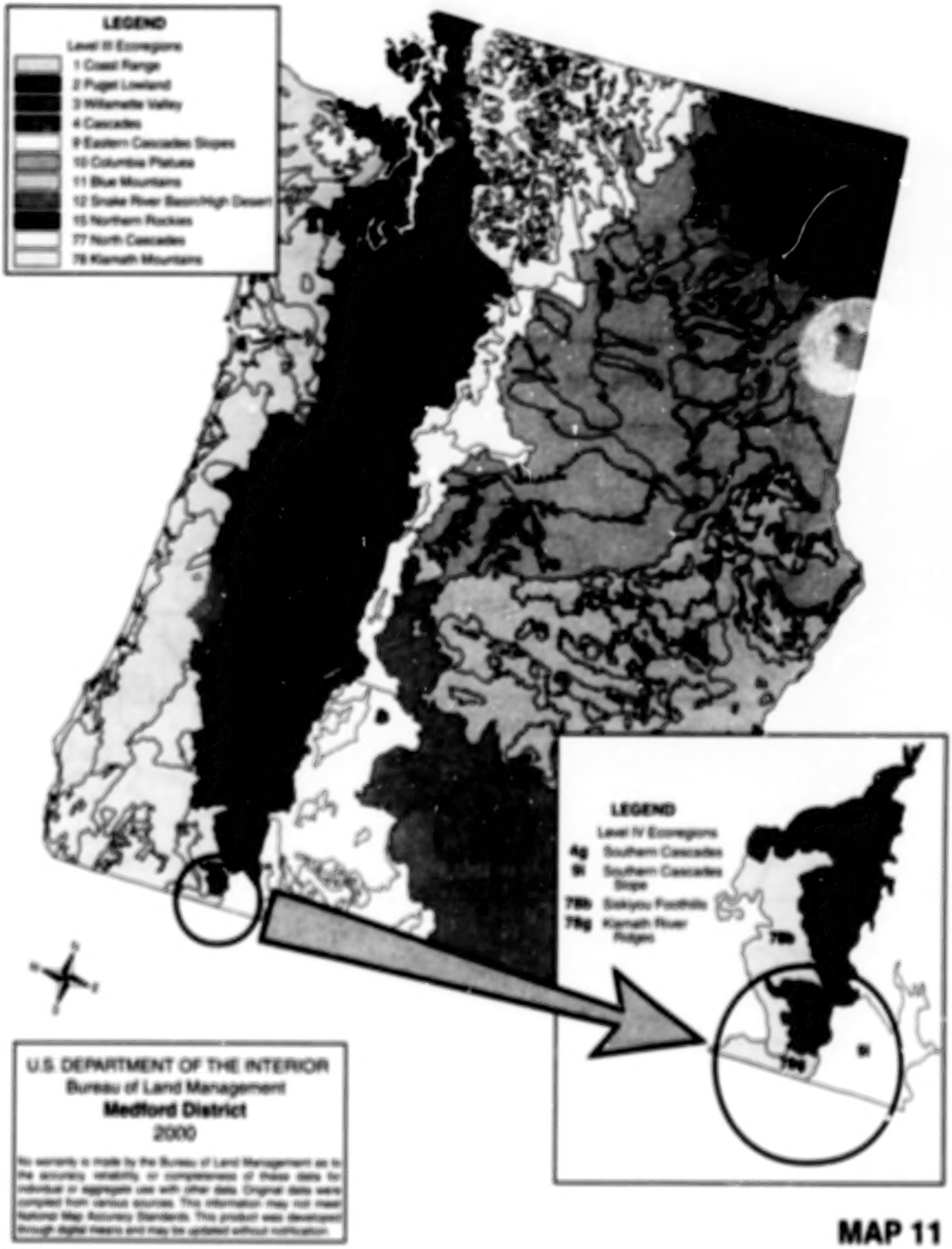
C.scade Siskiyou Ecological Emphasis Area
Ecoregions of Oregon and Washington



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[illegible] ecoregions.apr

MAP 11

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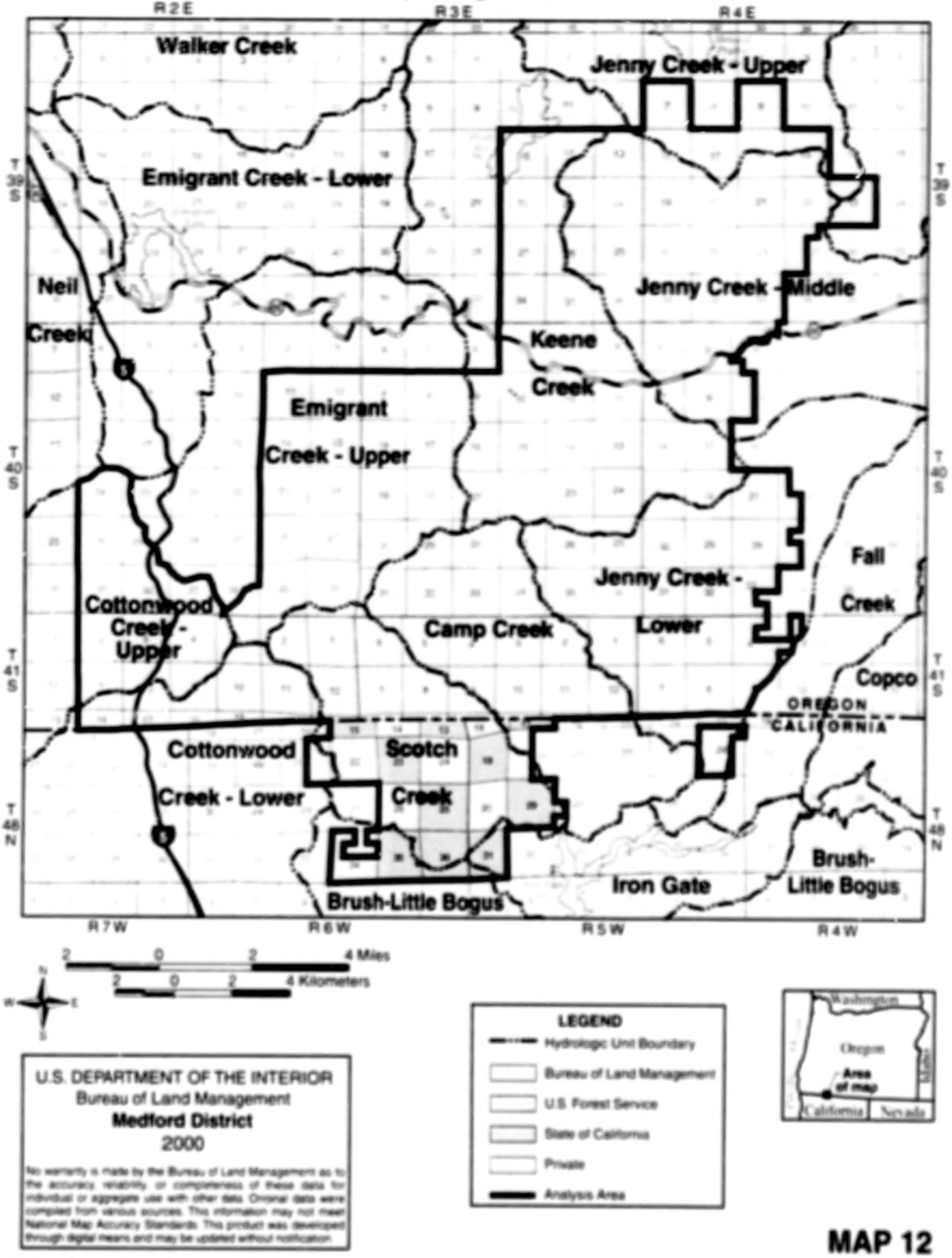
11

Cascade Siskiyou Ecological Emphasis Area
Hydrologic Units



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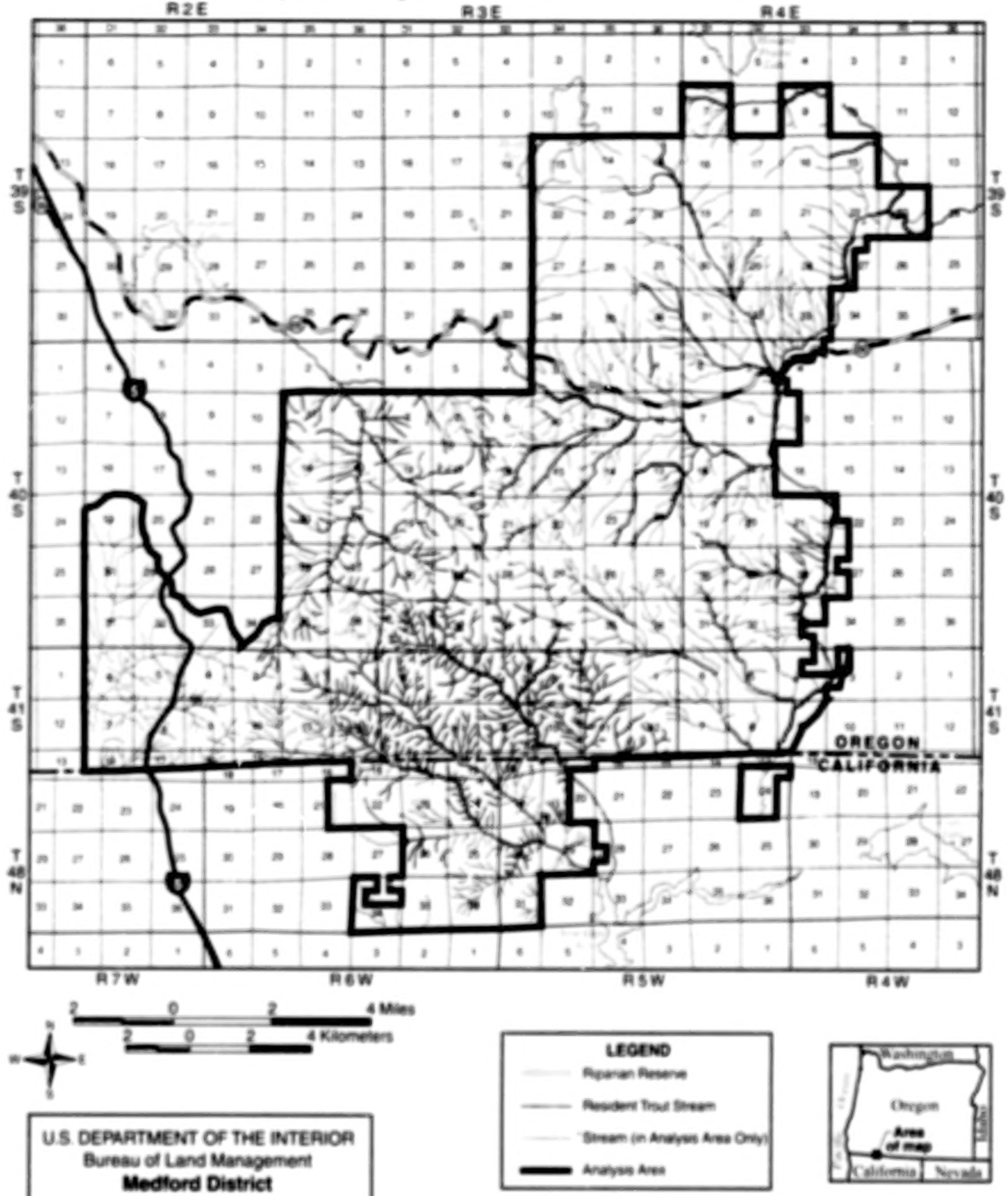
MAP 12

Cascade Siskiyou Ecological Emphasis Area
Stream Systems, Riparian Reserves and Fish Distribution



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MAP 13

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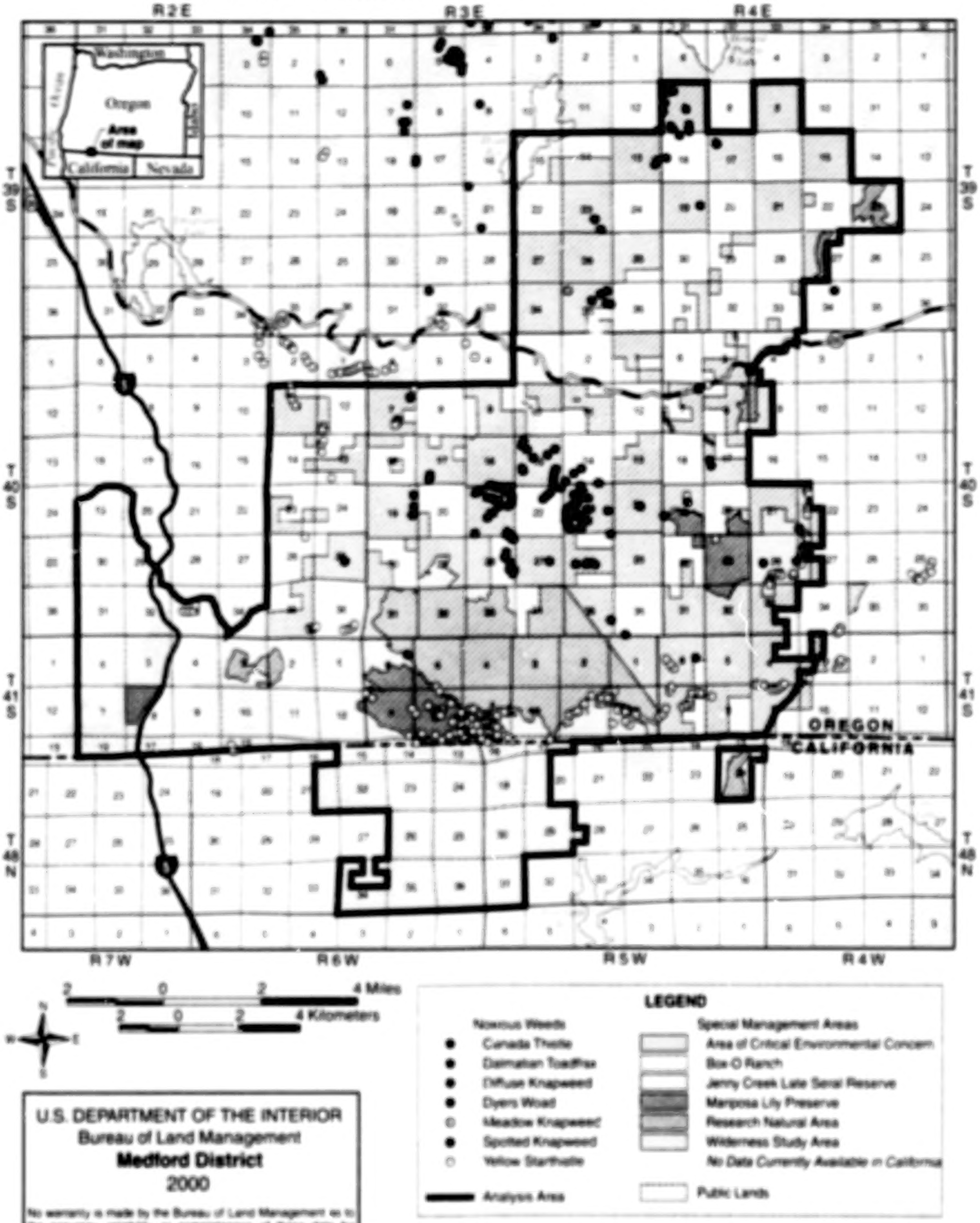
Cascade Siskiyou Ecological Emphasis Area
Noxious Weed Identification and Locations within the CSEEA



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MAP 14

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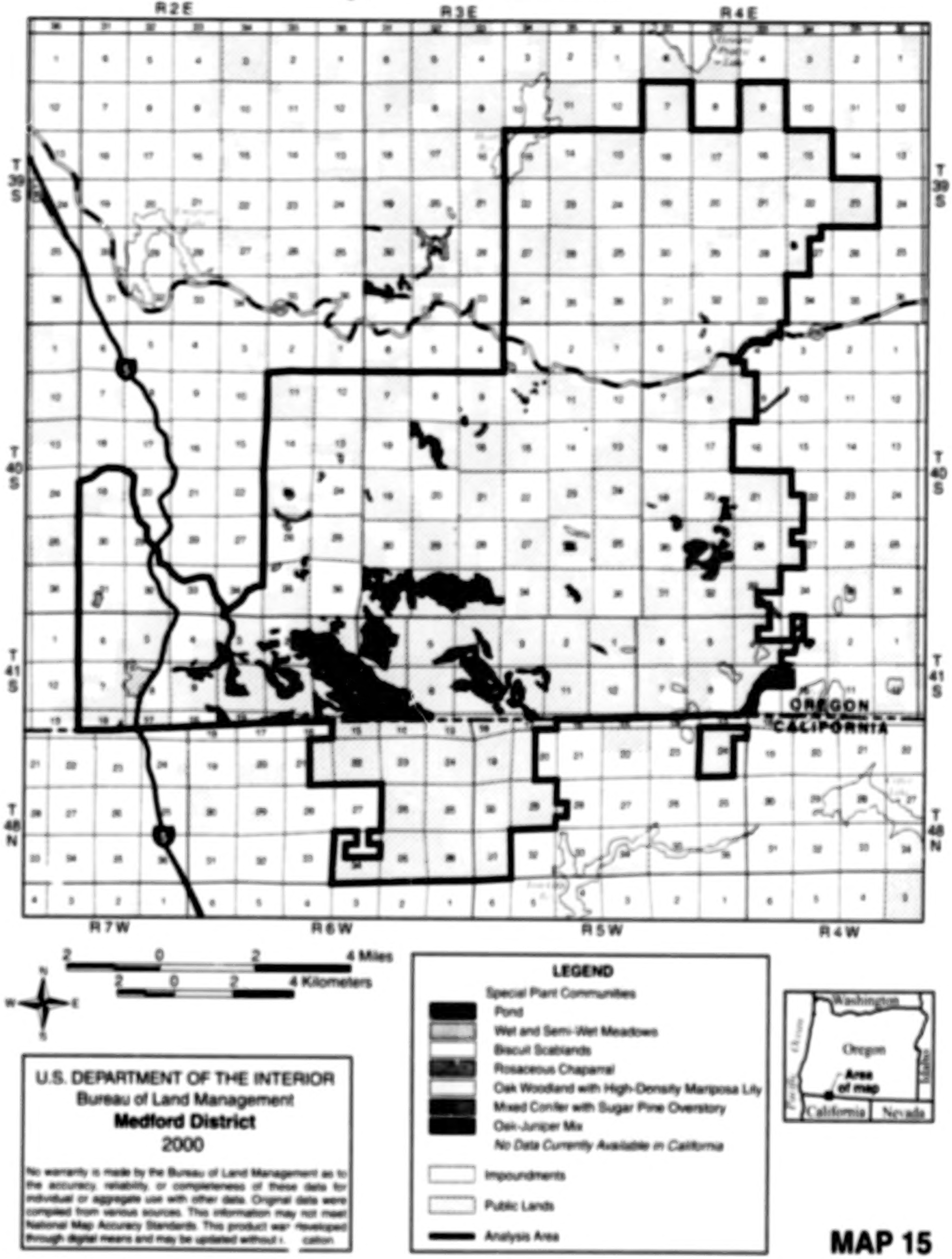
Cascade Siskiyou Ecological Emphasis Area
Special Plant Communities



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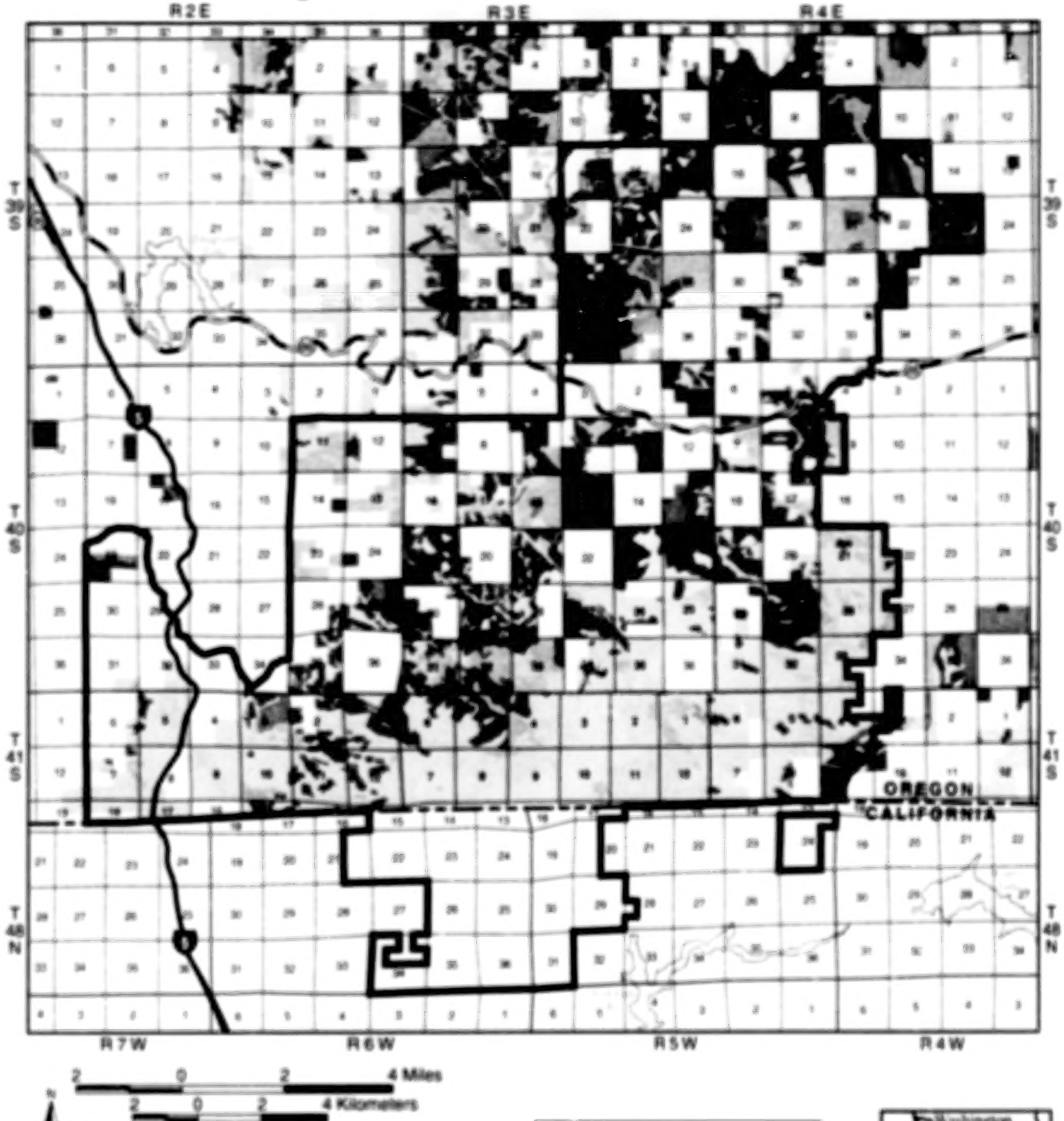
MAP 15

D01-03-2000 JR

15

Cascade Siskiyou Ecological Emphasis Area
Seral Stages of Conifer Communities within the CSEEA



LEGEND
- ▭ Non-Coniferous Communities
- ▭ Early Seral
- ▨ Poles (5"-11" DBH)
- ▨ Mid Seral (12"-21" DBH)
- ■ Mature/Old Growth (>21" DBH)
- ━ Analysis Area

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MAP 16

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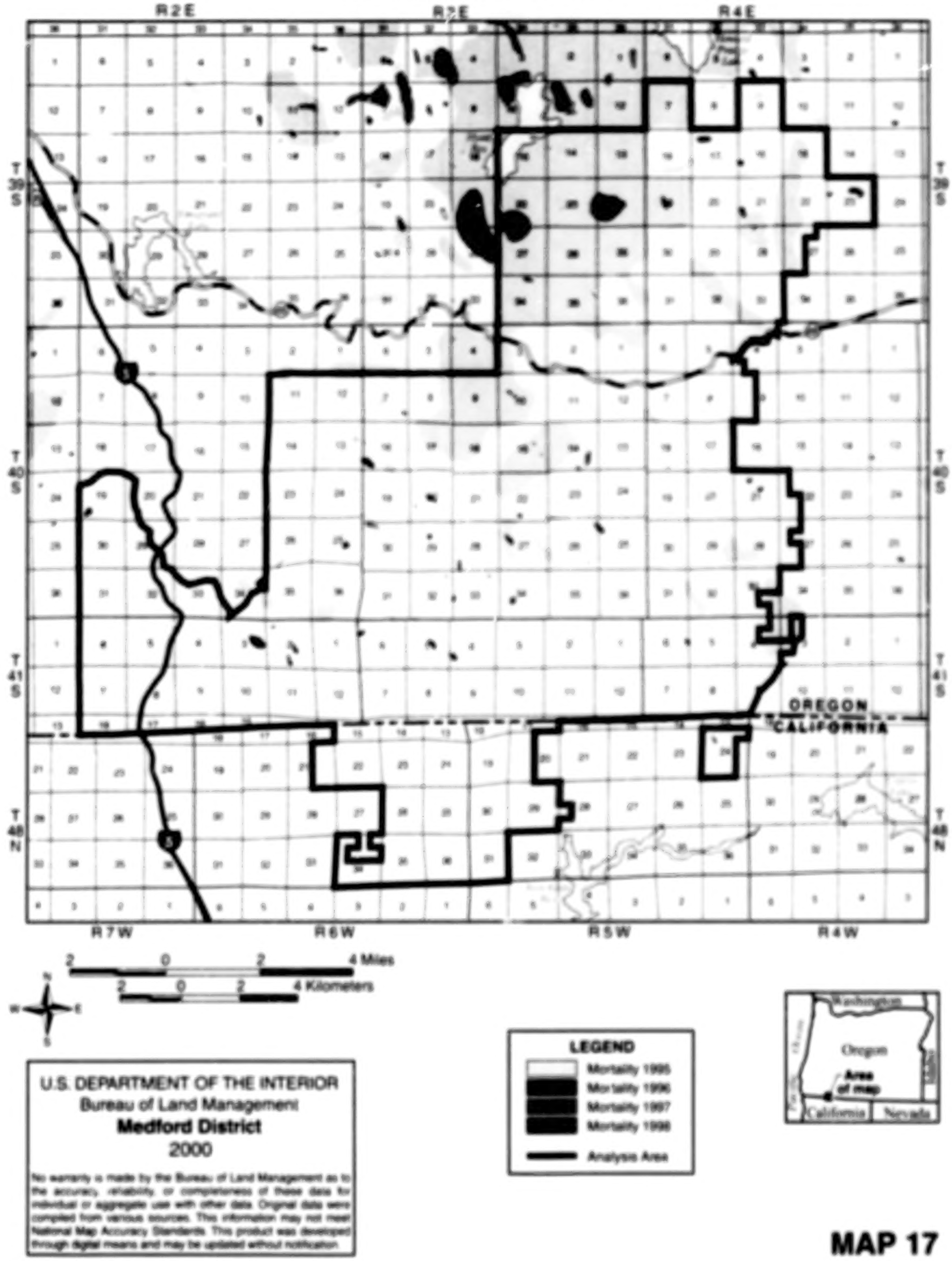
Cascade Siskiyou Ecological Emphasis Area
Insect Incident 1995-1998



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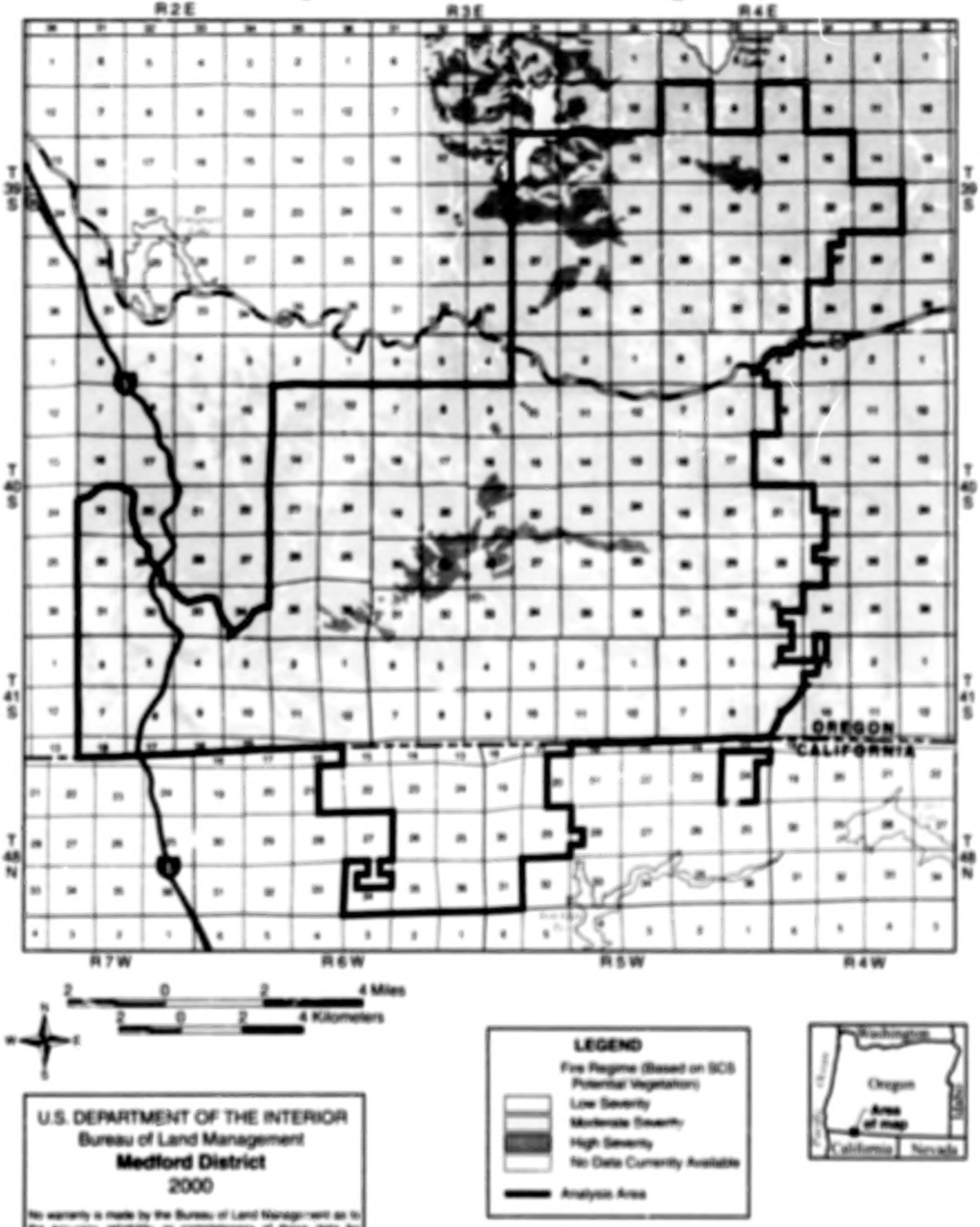
MAP 17

Cascade Siskiyou Ecological Emphasis Area
Fire Regime (Based on SCS Potential Vegitation)



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MAP 18

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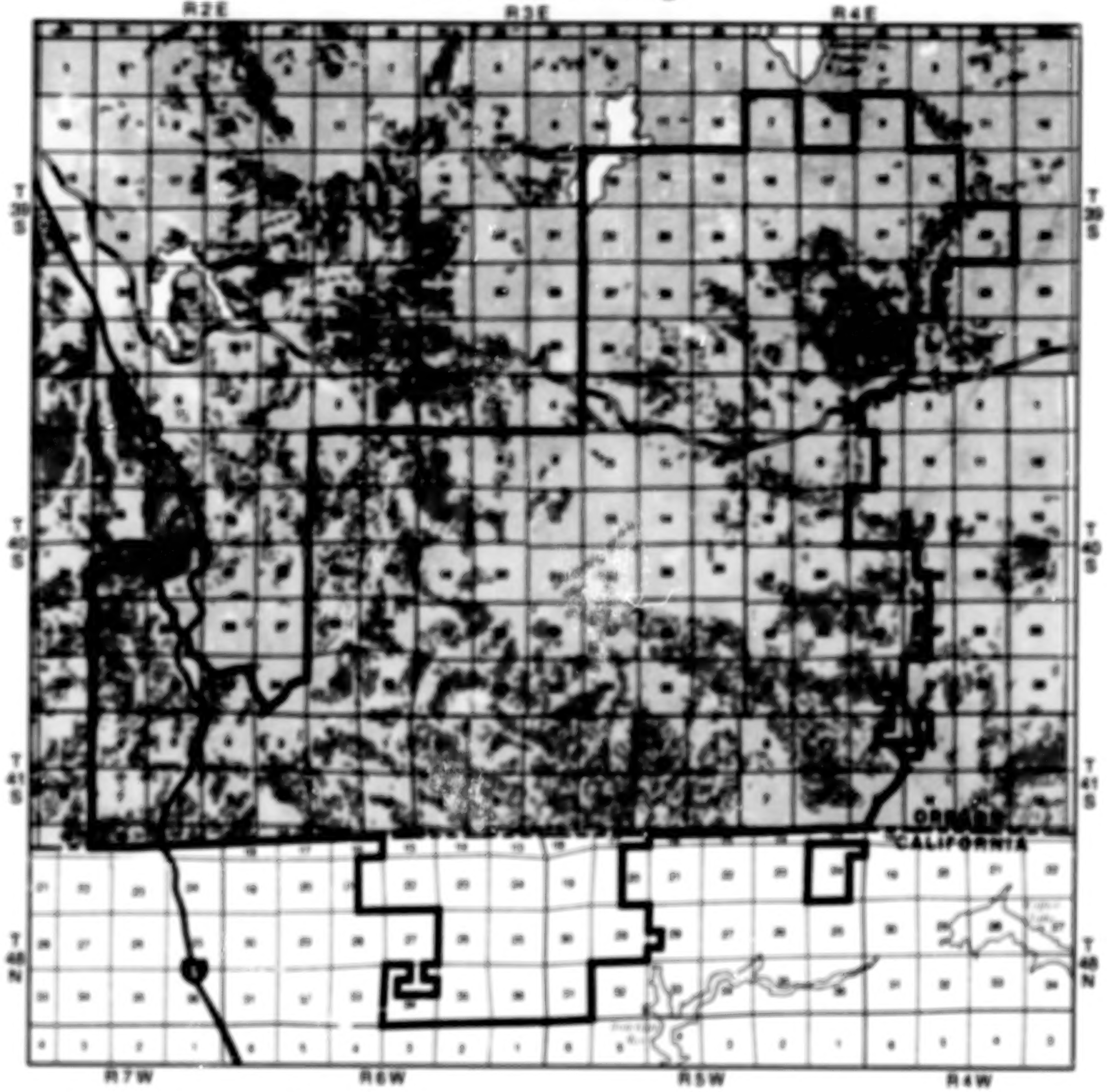
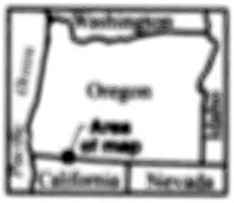
Cascade Siskiyou Ecological Emphasis Area
Fire Hazard Ratings



LEGEND

Fire Hazard Rating
- ☐ Low Severity
- ▨ Moderate Severity
- ■ High Severity
- ☐ No Data Currently Available

━ Analysis Area



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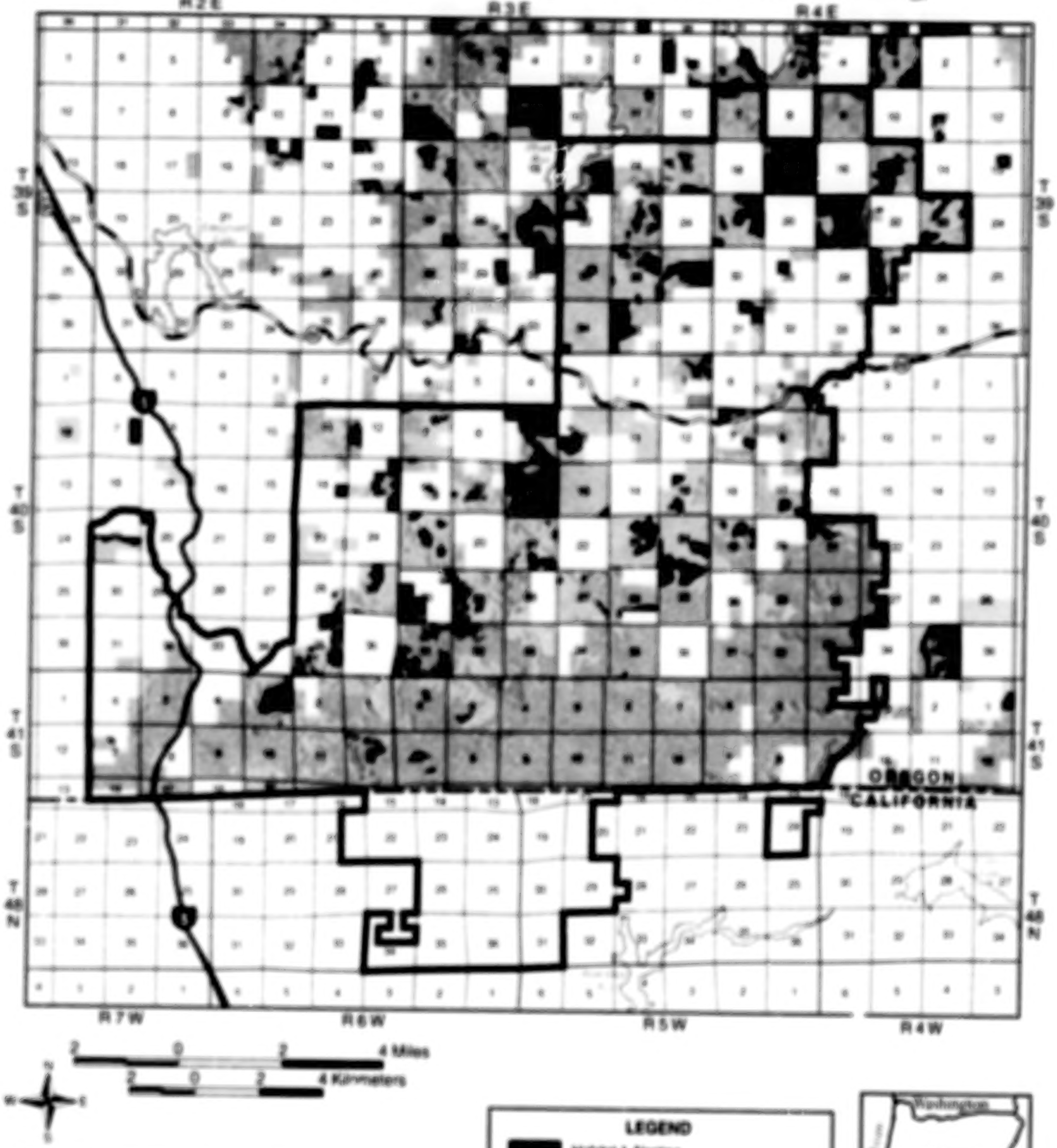
[illegible]

MAP 19

[illegible]

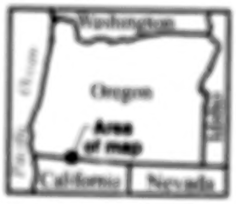
19

Cascade Siskiyou Ecological Emphasis Area
Northern Spotted Owl Habitat Types (Modified McKelvie Rating)



LEGEND

- ■ Habitat 1: Nesting
- ▨ Habitat 2: Roosting/Foraging
- ■ Habitat 3: Young Stands
- ▨ Habitat 4: No Potential
- ▨ Habitat 5: Dispersal with Potential
- ▨ Habitat 6: Dispersal with No Potential
- *No Data Currently Available in California*
- ━ Analysis Area



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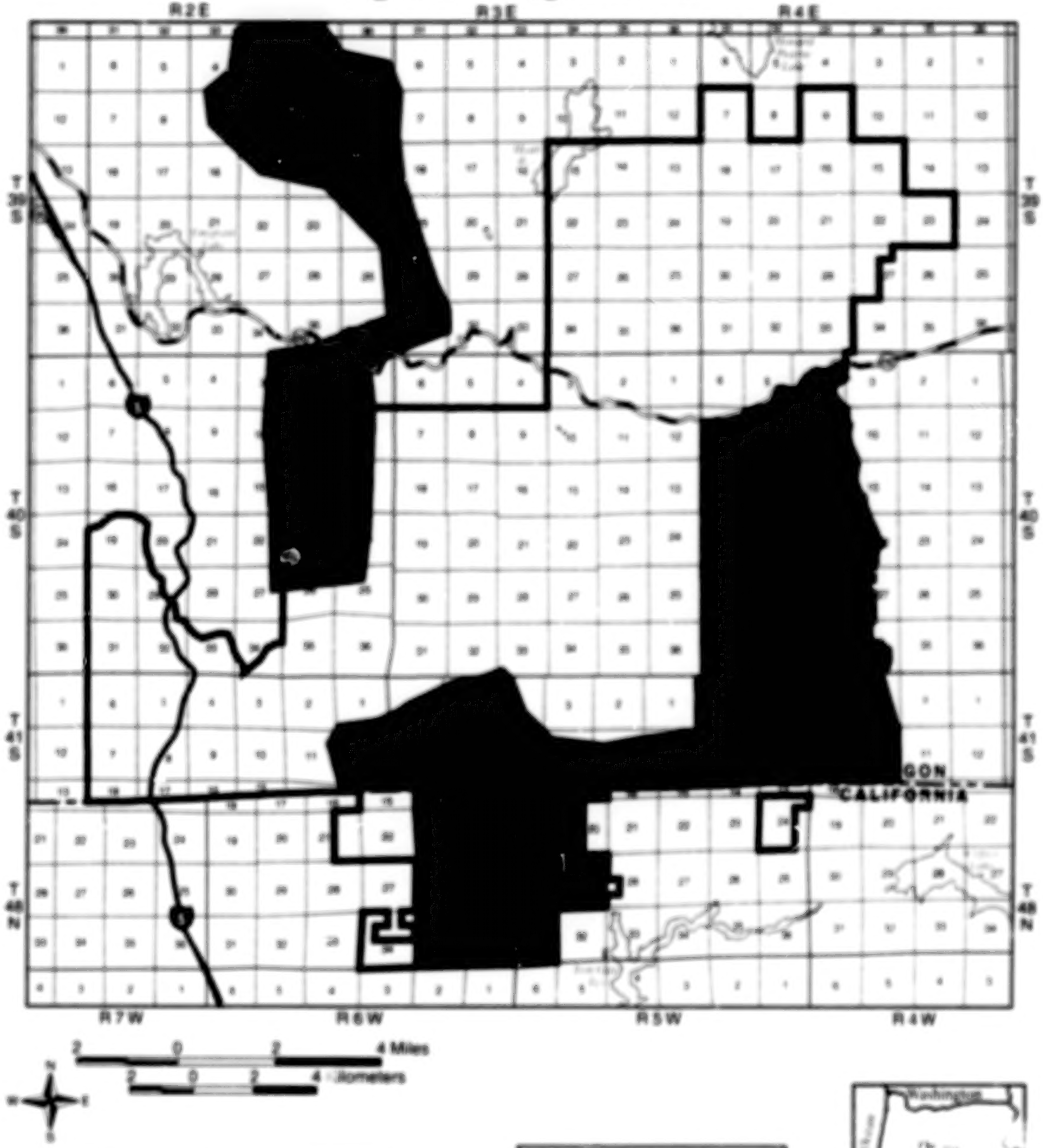
MAP 20

Cascade Siskiyou Ecological Emphasis Area
Big Game Management Area



LEGEND

■	Big Game Management Area
—	Analysis Area

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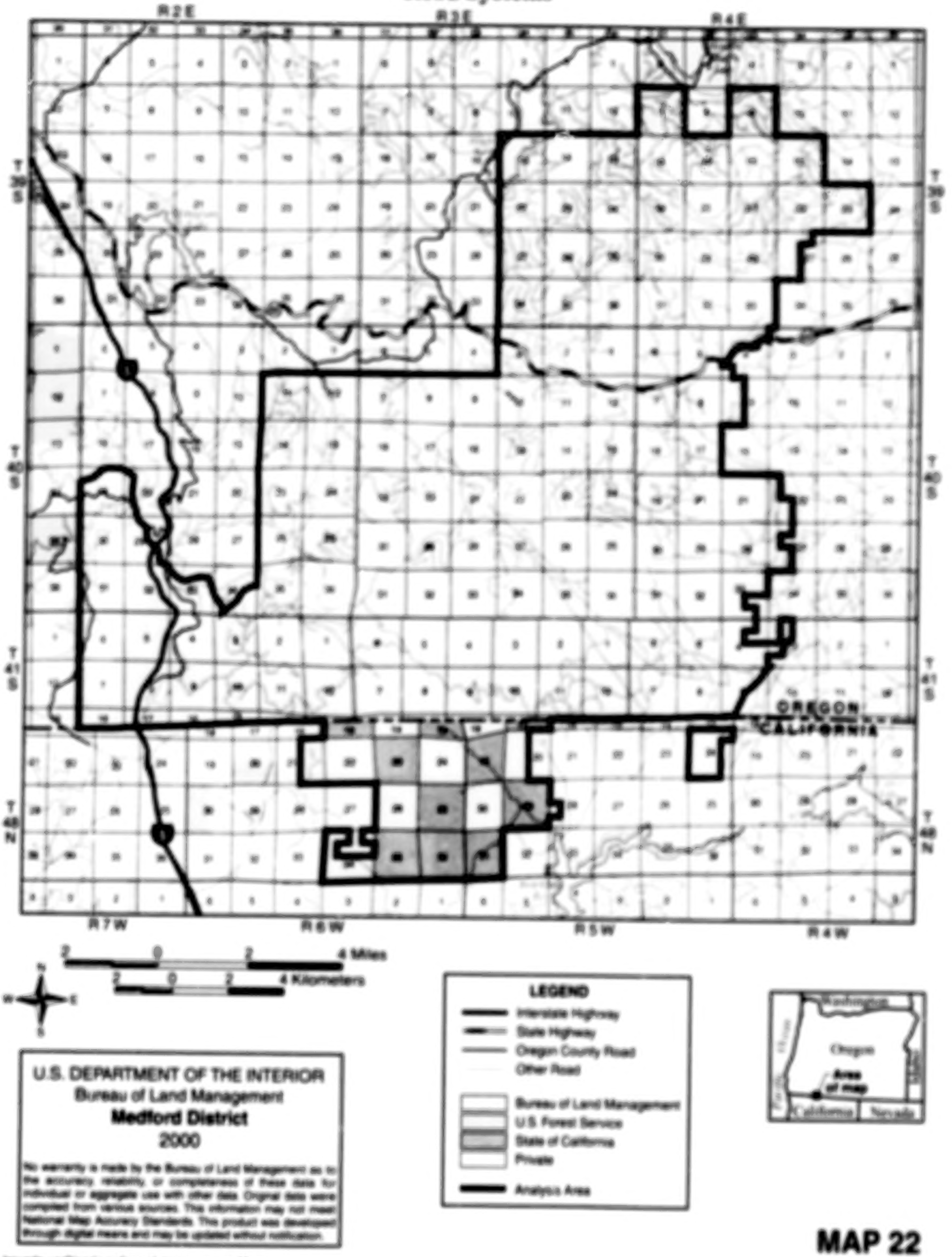
[illegible]

MAP 21

[illegible]

Cascade Siskiyou Ecological Emphasis Area
Road Systems



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MAP 22

001-03-2000 JR

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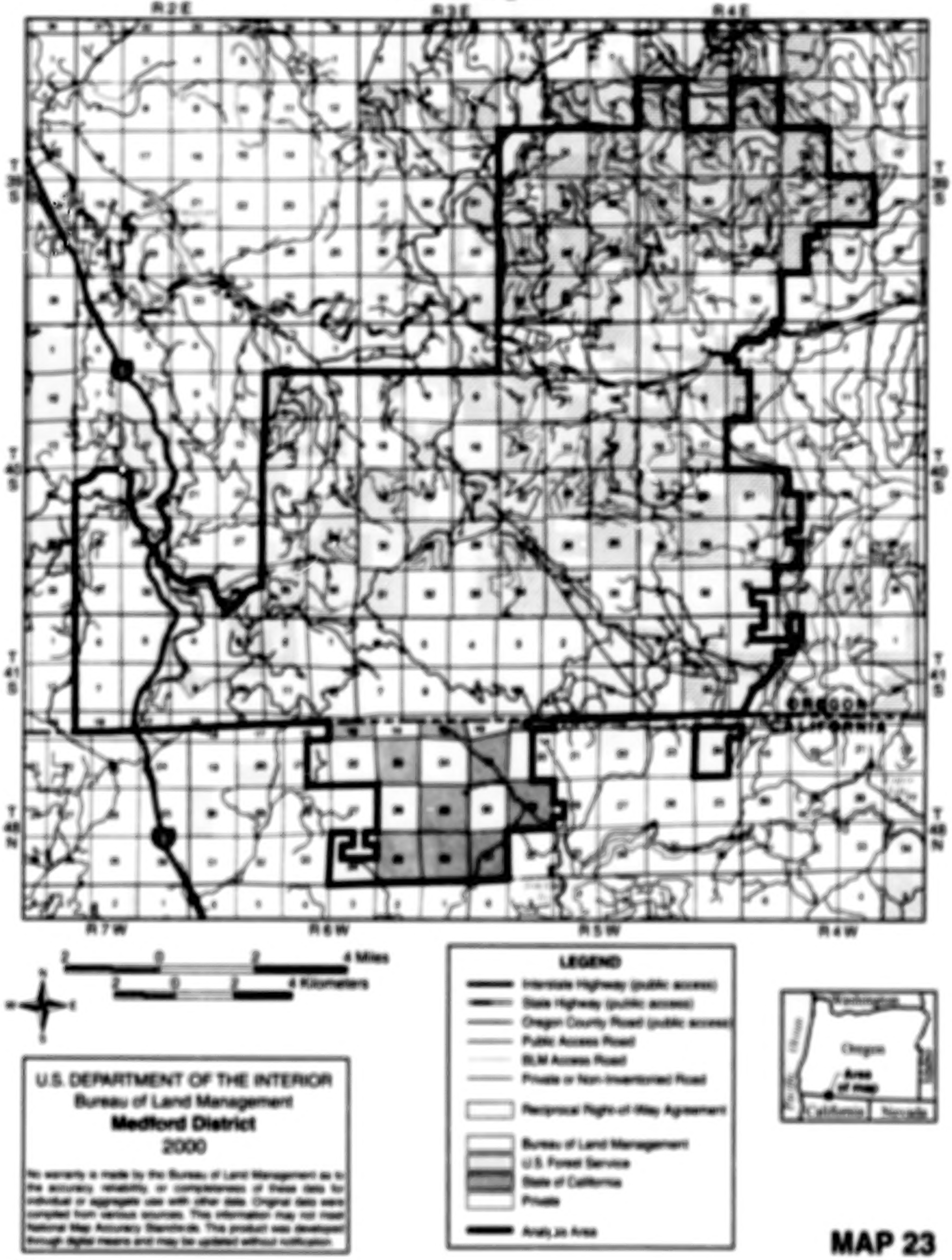
22

Cascade Siskiyou Ecological Emphasis Area
Access Rights



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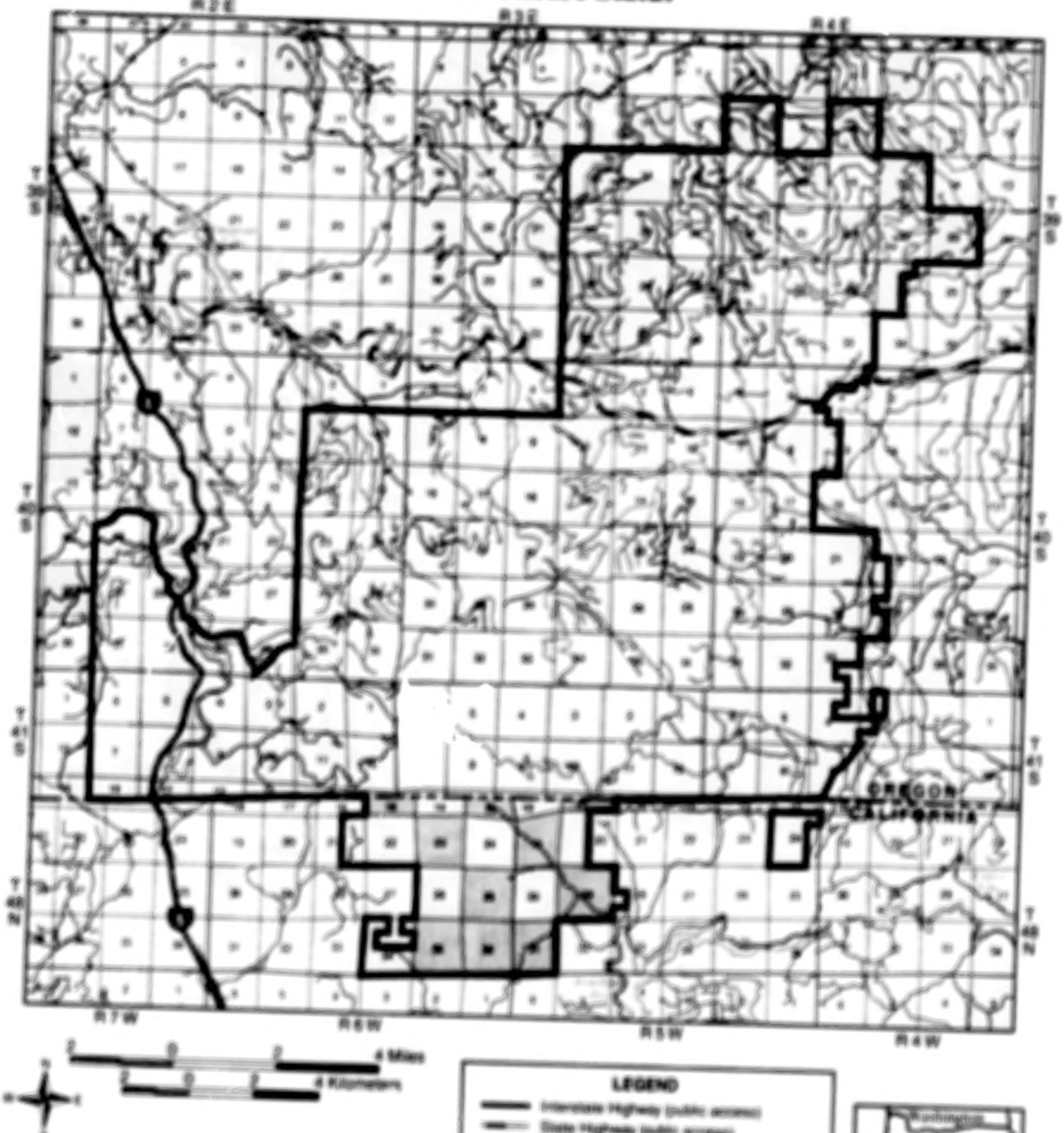
MAP 23

[illegible]

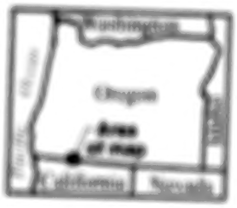
23

Cascade Siskiyou Ecological Emphasis Area
Road Closure Status



LEGEND

▬	Interstate Highway (public access)
▬	State Highway (public access)
—	Oregon County Road (public access)
—	Open BLM Road
—	Closed BLM Road (seasonal and permanent)
—	Closed Road, Private or Non-Inventoried
☐	Bureau of Land Management
☐	U.S. Forest Service
▨	State of California
☐	Private
▬	Analysis Area



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Medford District
2000

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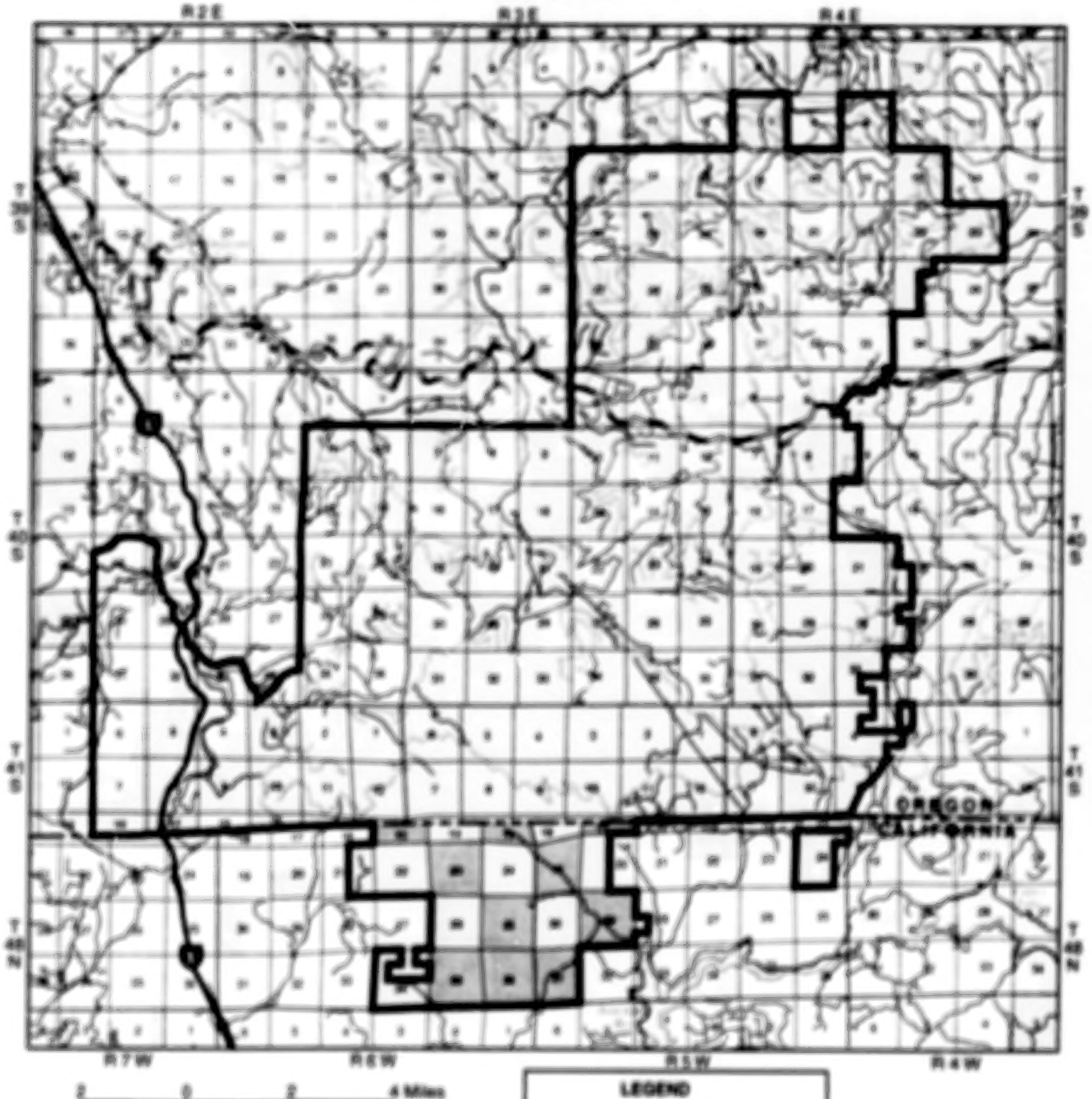
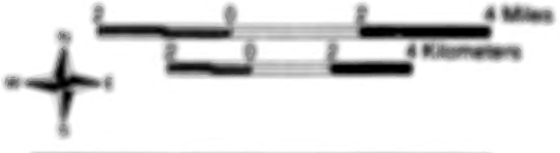
[illegible]

MAP 24

[illegible]

Cascade Siskiyou Ecological Emphasis Area
Road Maintenance Level



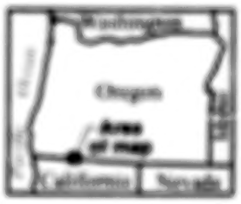


LEGEND

- Interstate Highway
- State Highway
- Oregon County Road
- Maintenance Level 1
- Maintenance Level 2
- Maintenance Level 3
- Maintenance Level 4
- No Maintenance Level Assigned

- Bureau of Land Management
- U.S. Forest Service
- State of California
- Private

- Analysis Area



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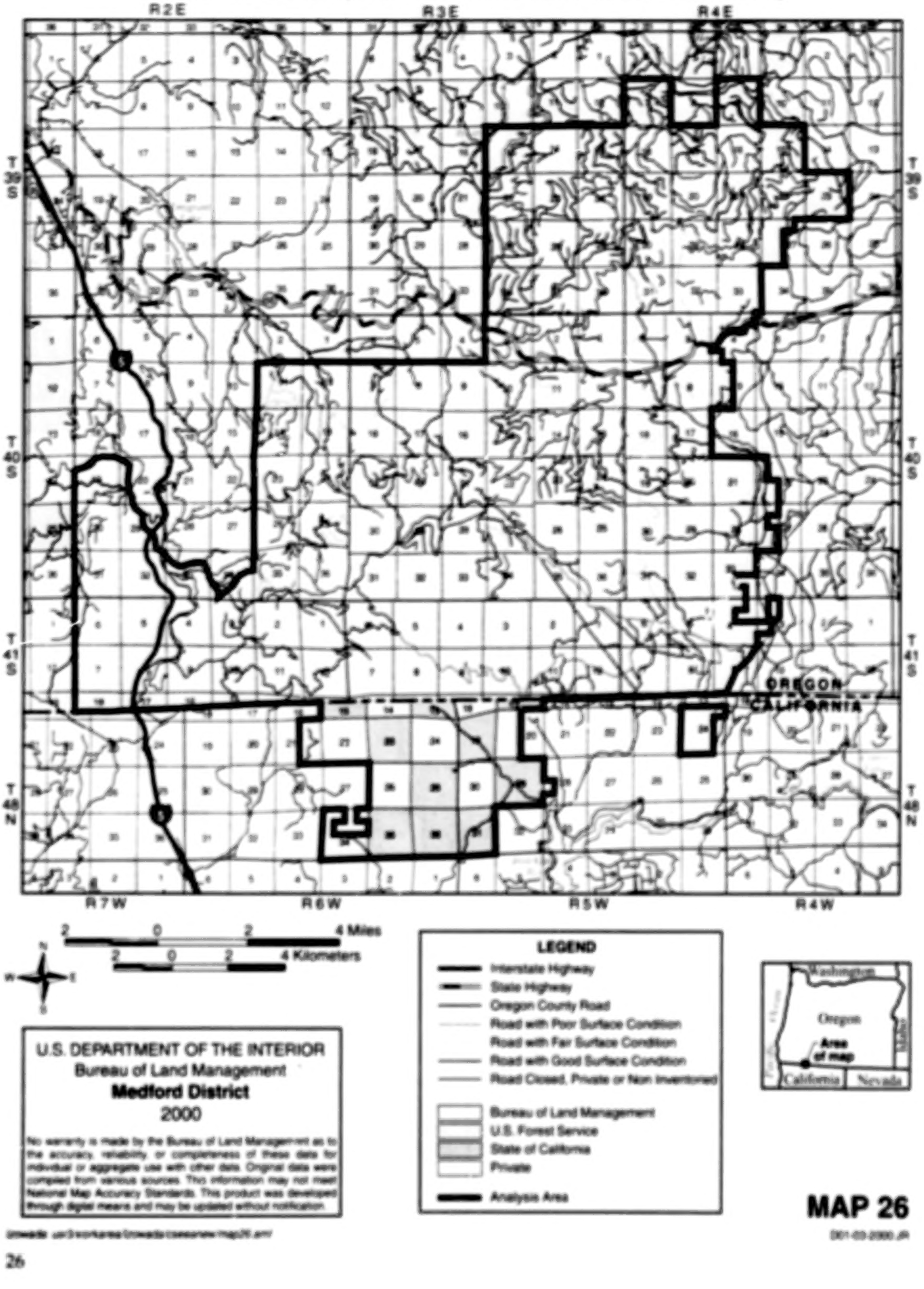
MAP 25

Cascade Siskiyou Ecological Emphasis Area
Surface Condition (Based on TMOs and Maintenance Level)



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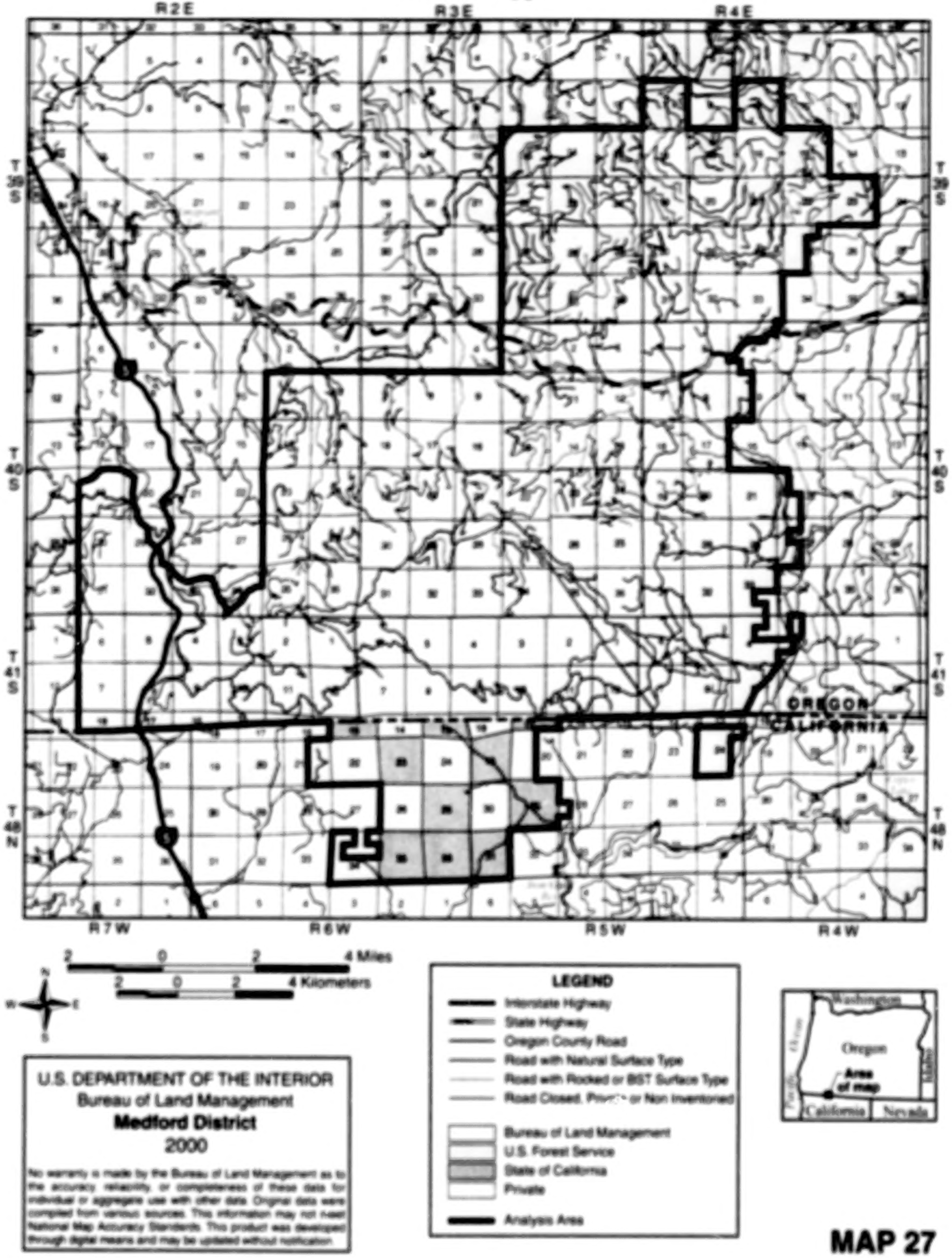
MAP 26

/cewada usr3/workarea/cewada/csesonew/map26.aml

001-03-2000 JR

Cascade Siskiyou Ecological Emphasis Area
Surface Type



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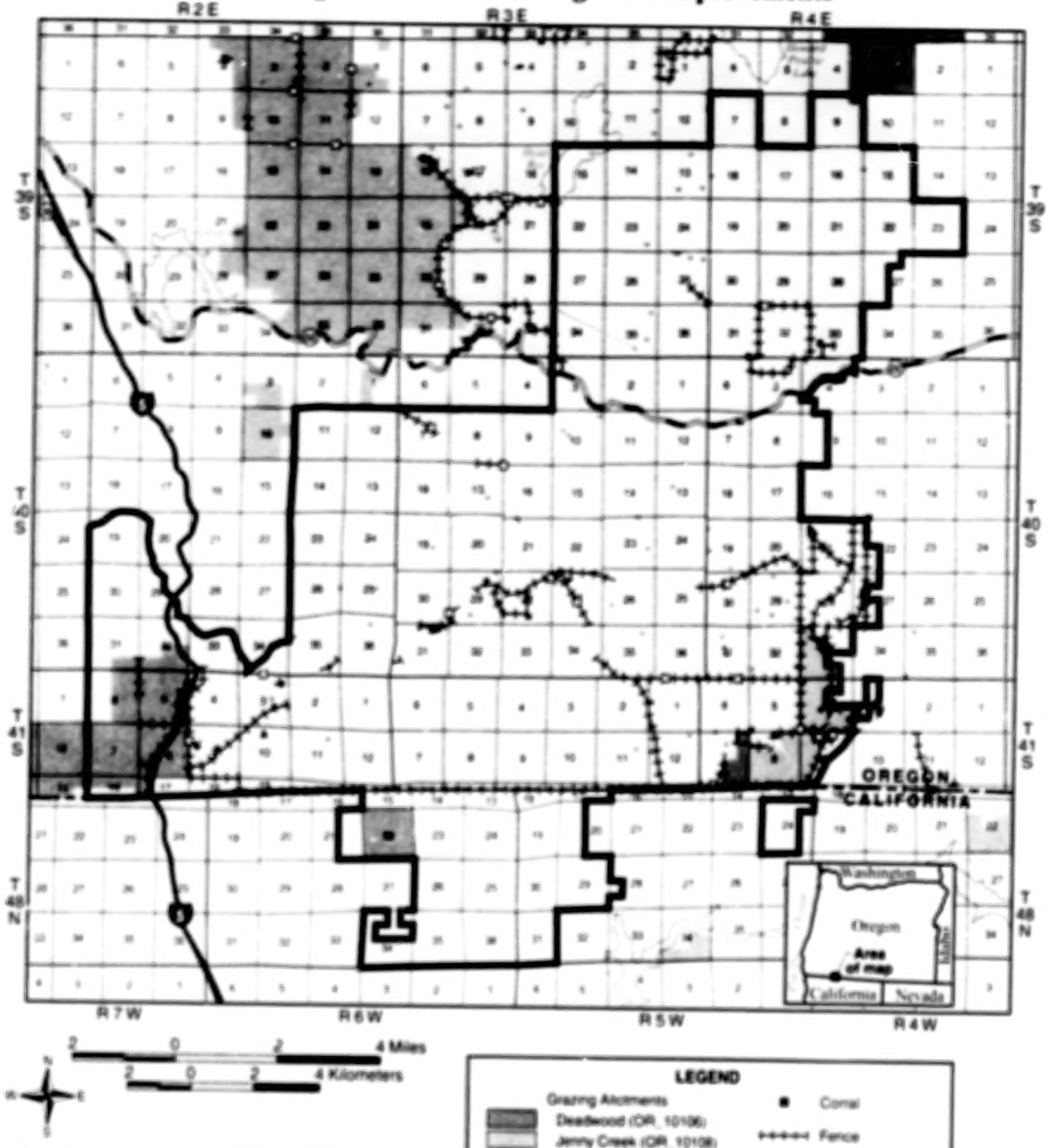
MAP 27

/zowada_usr3/workarea/zowada/csea/new/map27.aml

D01-03-2000.JR

27

Cascade Siskiyou Ecological Emphasis Area
Grazing Allotments and Rangeland Improvements



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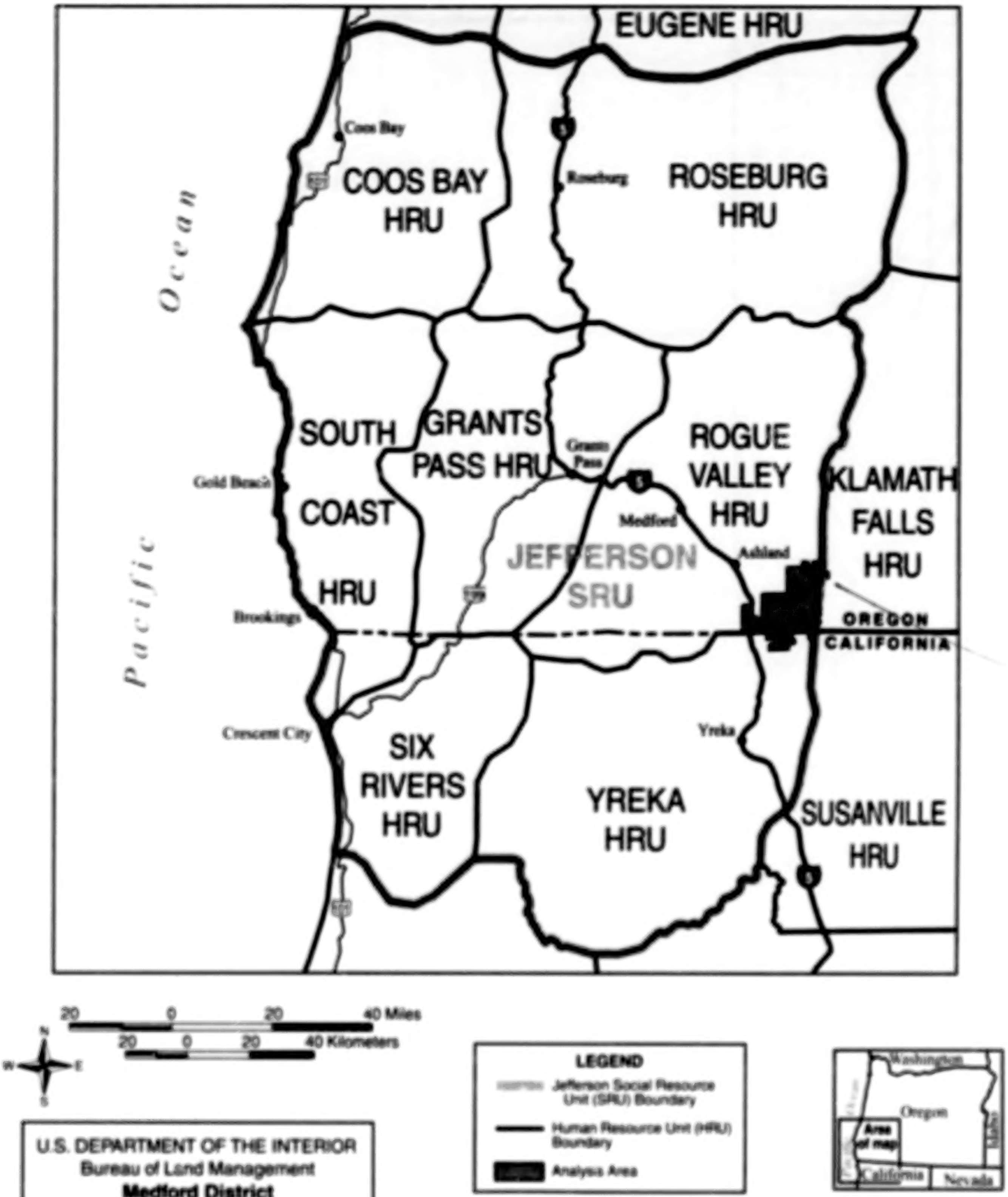
MAP 28

D01-03-2000 JR

cnwade usr3/workarea/cswade/csesarew/map28.aml

Cascade Siskiyou Ecological Emphasis Area Social and Human Resource Units



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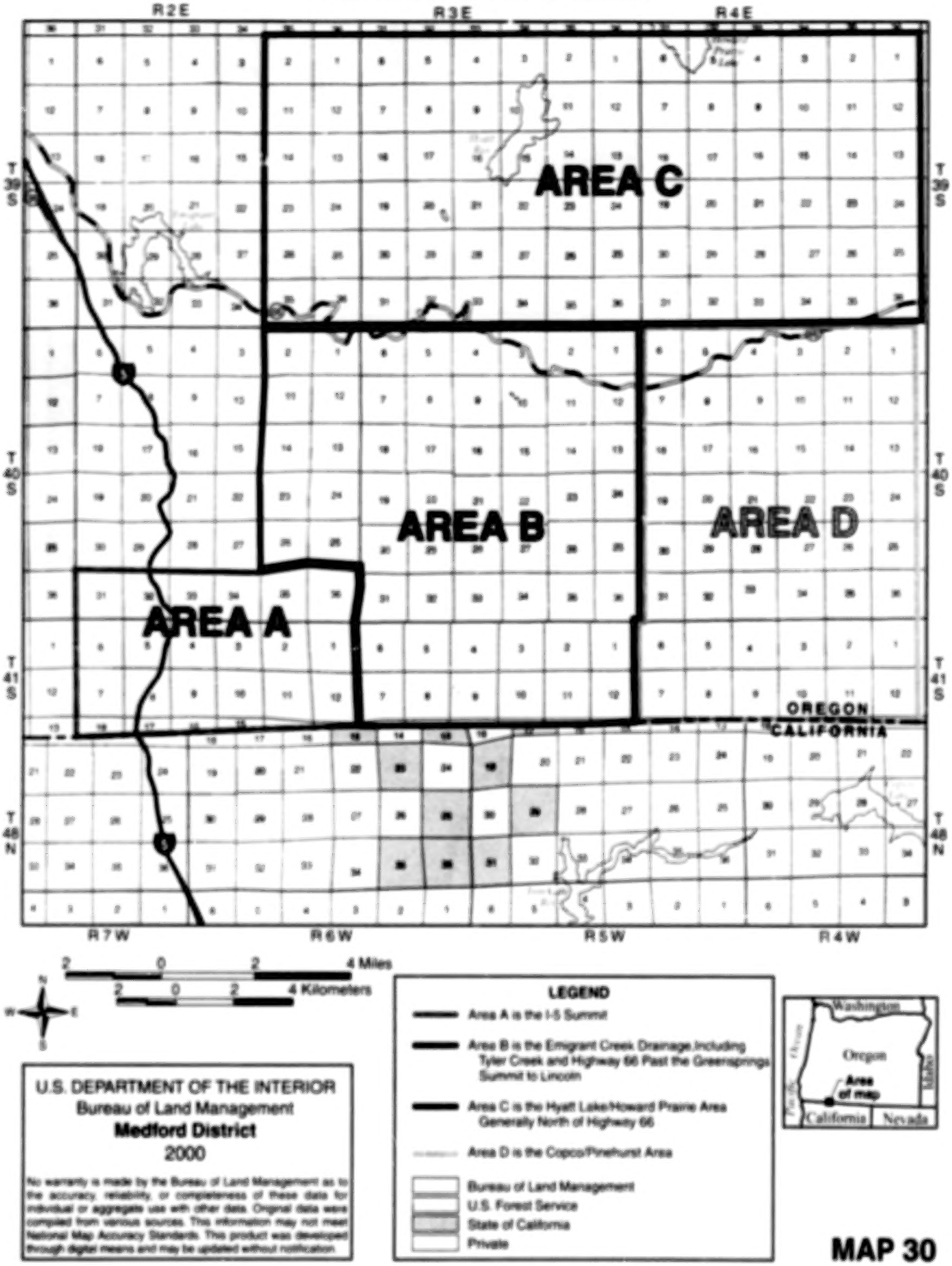
cnewada: usr3/workarea/cnewada/cseanew/map29.aml

MAP 29

001-03-2000 JR

29

Cascade Siskiyou Ecological Emphasis Area
Socioeconomic Areas of CSEEA



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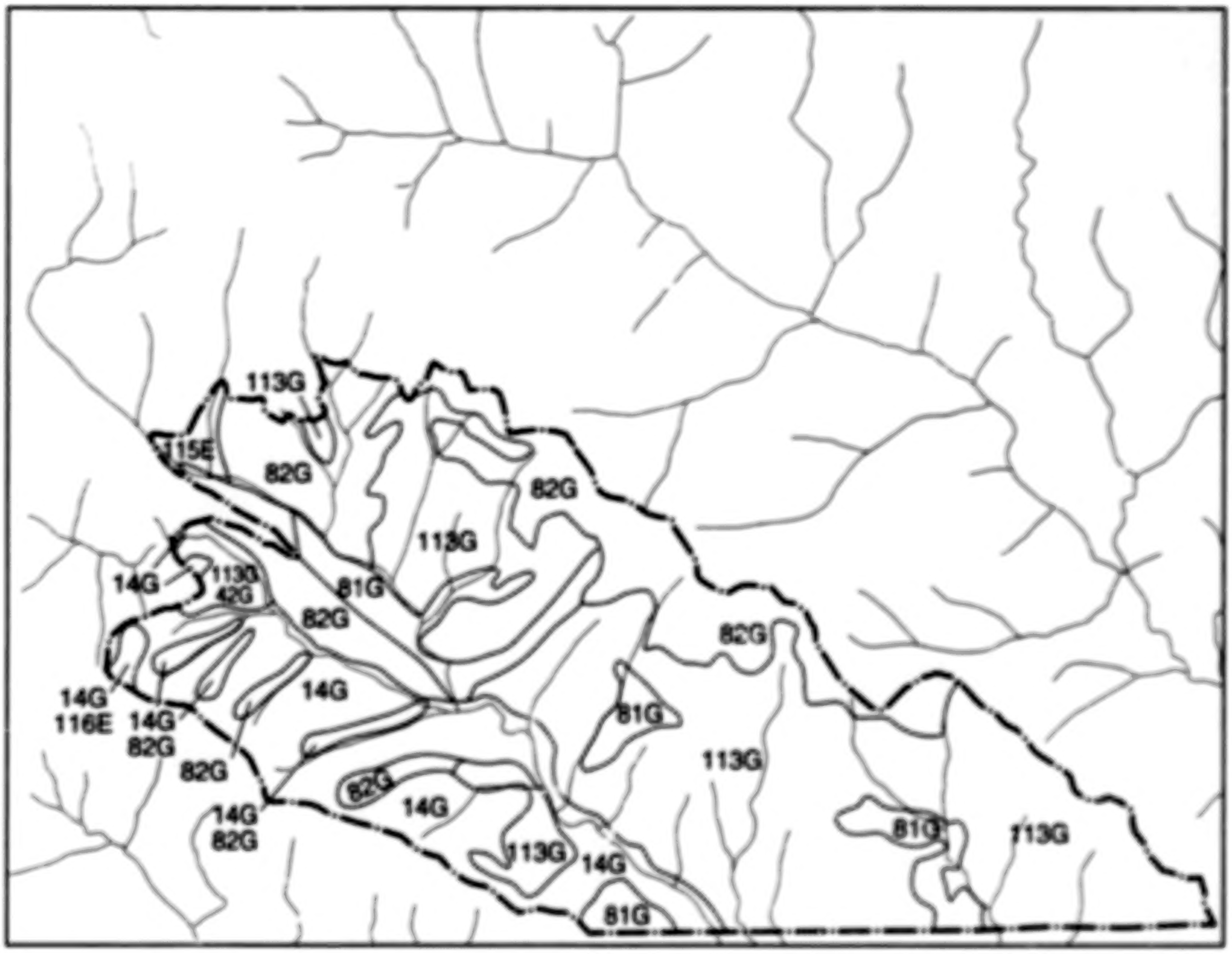
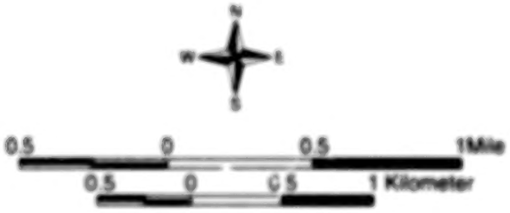
MAP 30

lcrowde: usr3/workarea/lcrowde/cseeanew/map30.aml

D01-03-2000 JR

Cascade Siskiyou Ecological Emphasis Area
Soils of Scotch Creek RNA



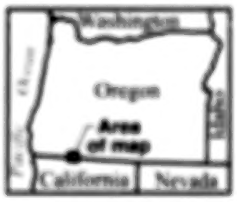


LEGEND

Soil Type Boundary--see Table 2-29 for Soil Description

Scotch Creek RNA Boundary

Public Lands



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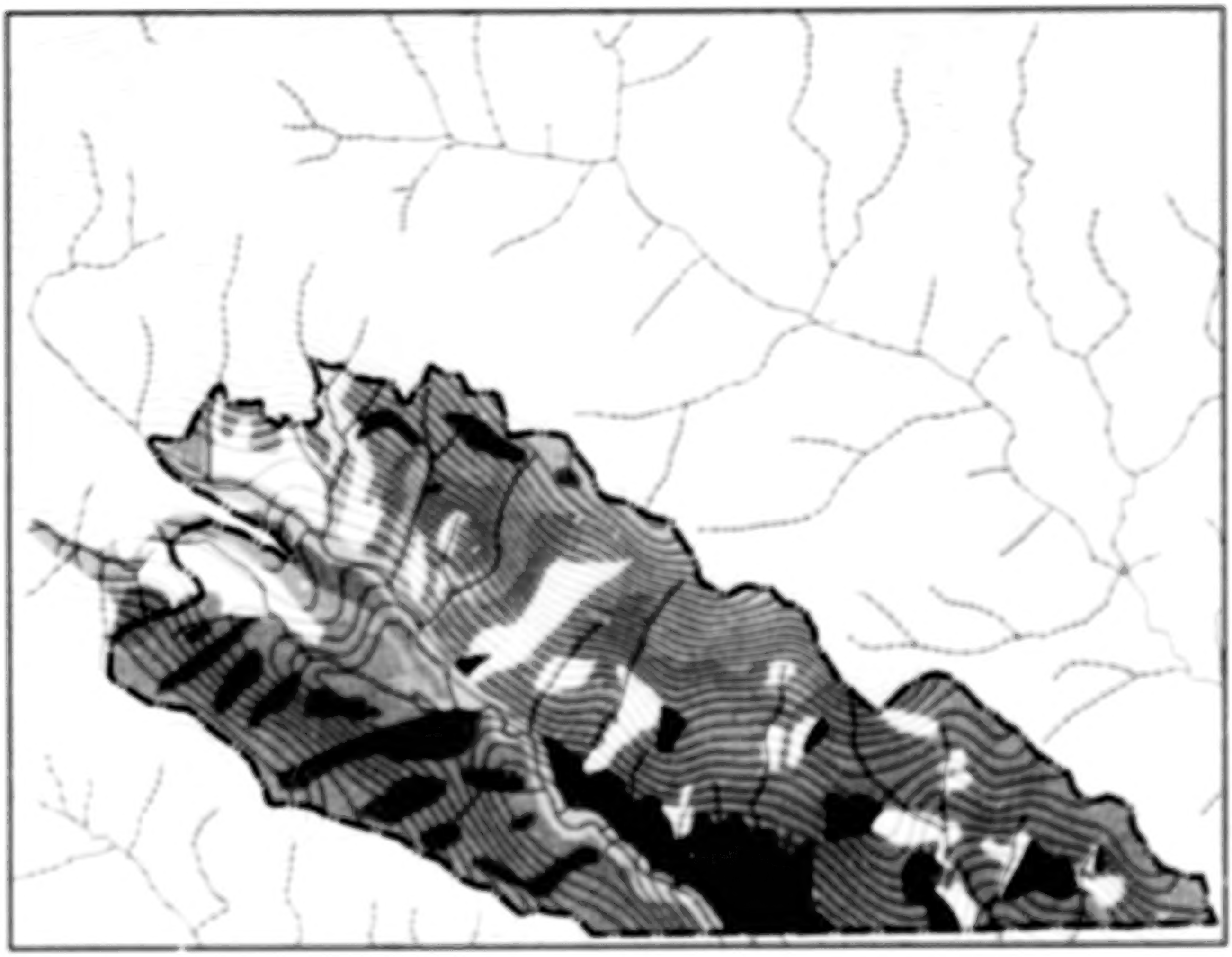
phoden: artwork/soils_orgscotch.apr

MAP 31

D01-03-2000 JR

Cascade Siskiyou Ecological Emphasis Area
Distribution of Plant Communities of Scotch Creek RNA


N
W
E
S
0.5
0
0.5
1 Mile
0.5
0
0.5
1 Kilometer
LEGEND
Scotch Creek RNA Boundary
Contours, 50-Foot Interval
Scotch Creek RNA Plant Communities
Lower Slope Grassland/Rock Outcrop Complex
Middle Slope Grassland/White Oak Woodland Complex
Garry Oak/Klamath Plum-Wedgeleaf Ceanothus Chaparral
Garry Oak/Hollyleaved Barberry (tall) Woodland
Riparian Bigleaf Maple-Garry Oak Woodland
Garry Oak/Birchleaf Mountain Mahogany-Klamath Plum Chaparral Complex (Lone Pine Ridge)
White Fir/Hollyleaved Barberry (dwarf) Association
Douglas-Fir/Serviceberry-Hollyleaved Barberry (tall)
Garry Oak/Birchleaf Mountain Mahogany-Common Snowberry Chaparral Complex (Slide Ridge)
Douglas-Fir-Garry Oak Potential in Slide Ridge Complex
Unknown
Rock Outcrop
Washington
Oregon
Area of map
Idaho
California
Nevada

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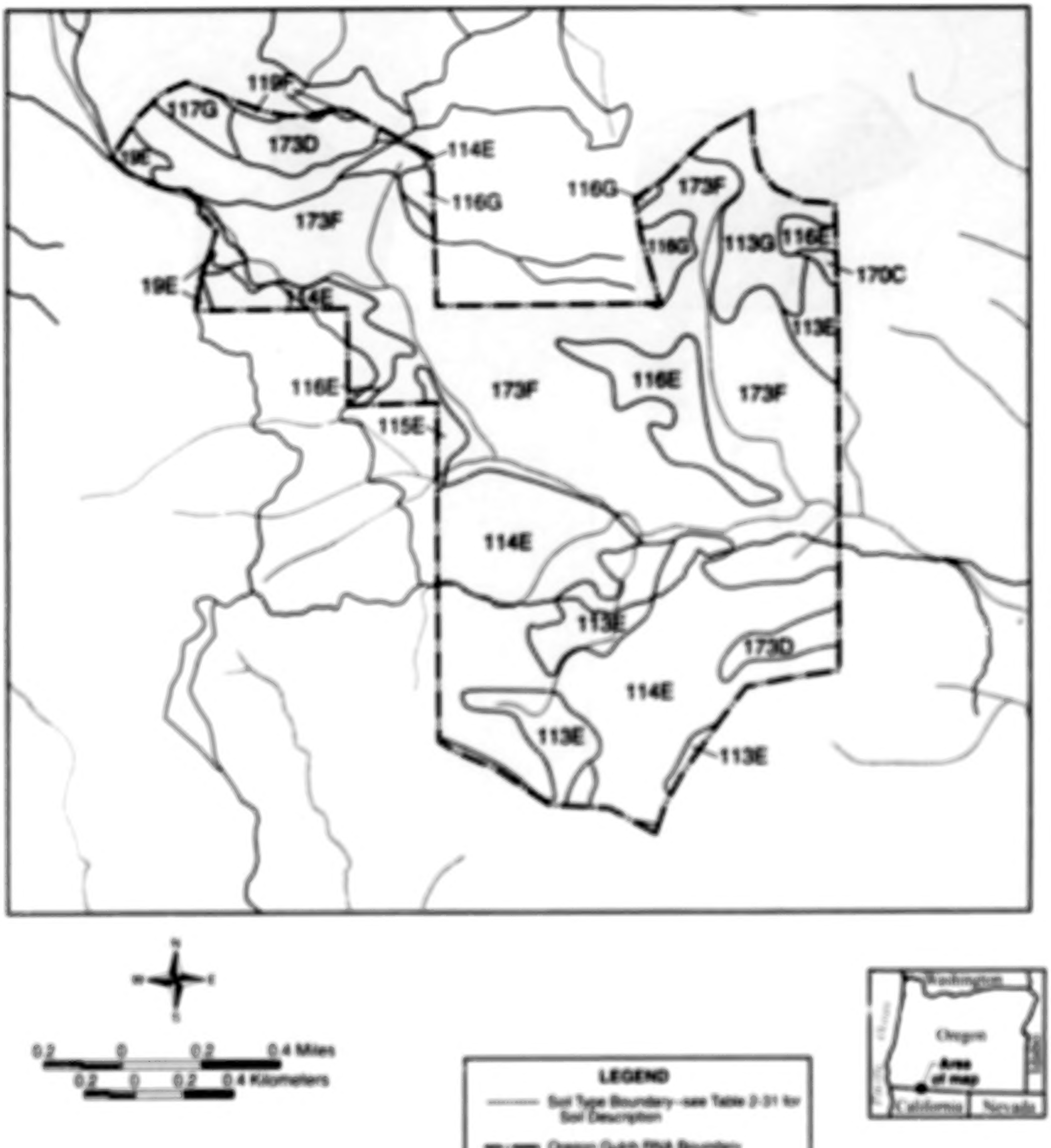
MAP 32

Cascade Siskiyou Ecological Emphasis Area
Soils of Oregon Gulch RNA



LEGEND

- Soil Type Boundary--see Table 2-31 for Soil Description
- Oregon Gulch RNA Boundary
- Road
- Public Lands

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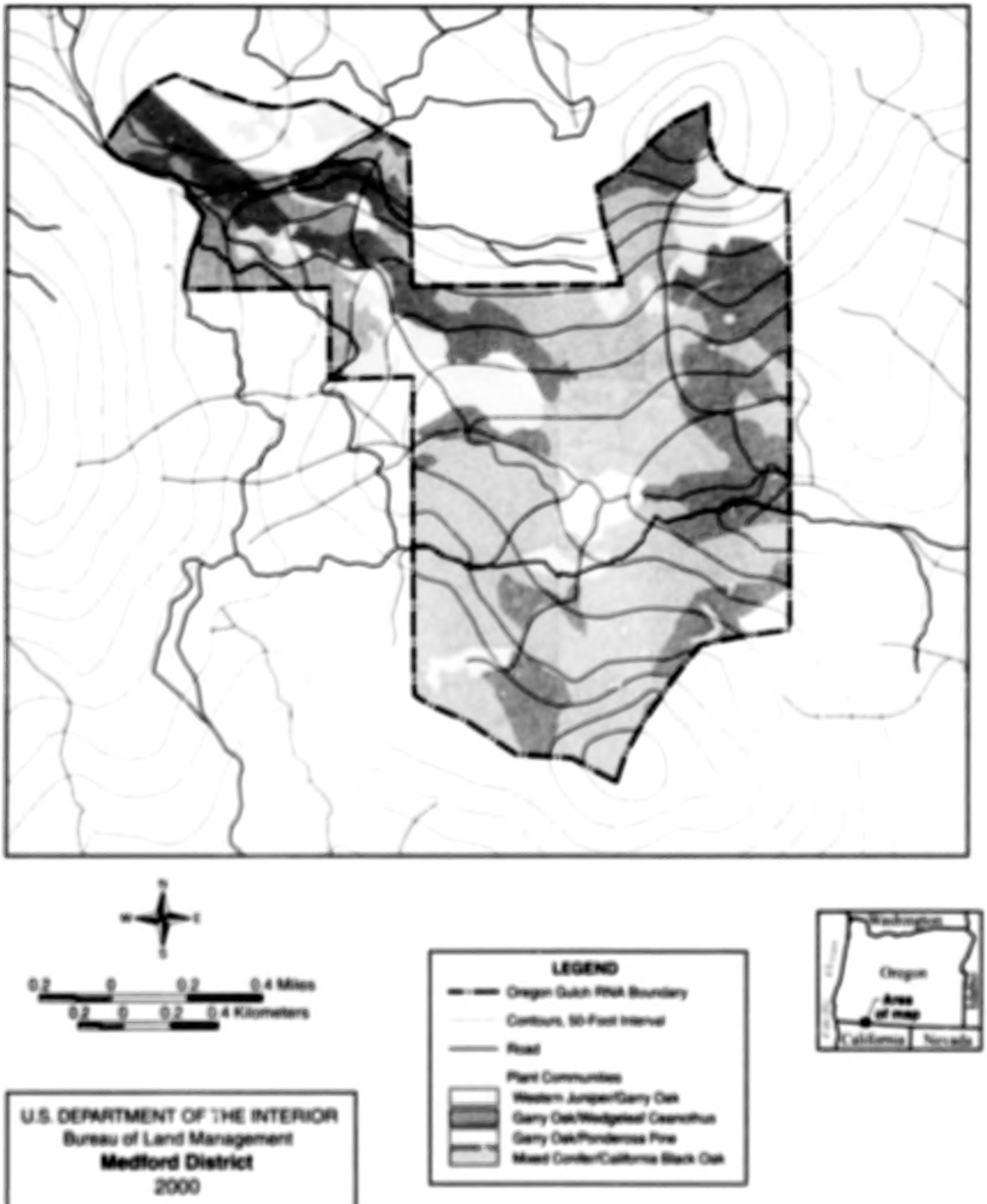
MAP 33

Cascade Siskiyou Ecological Emphasis Area
Distribution of Plant Communities of Oregon Gulch RNA



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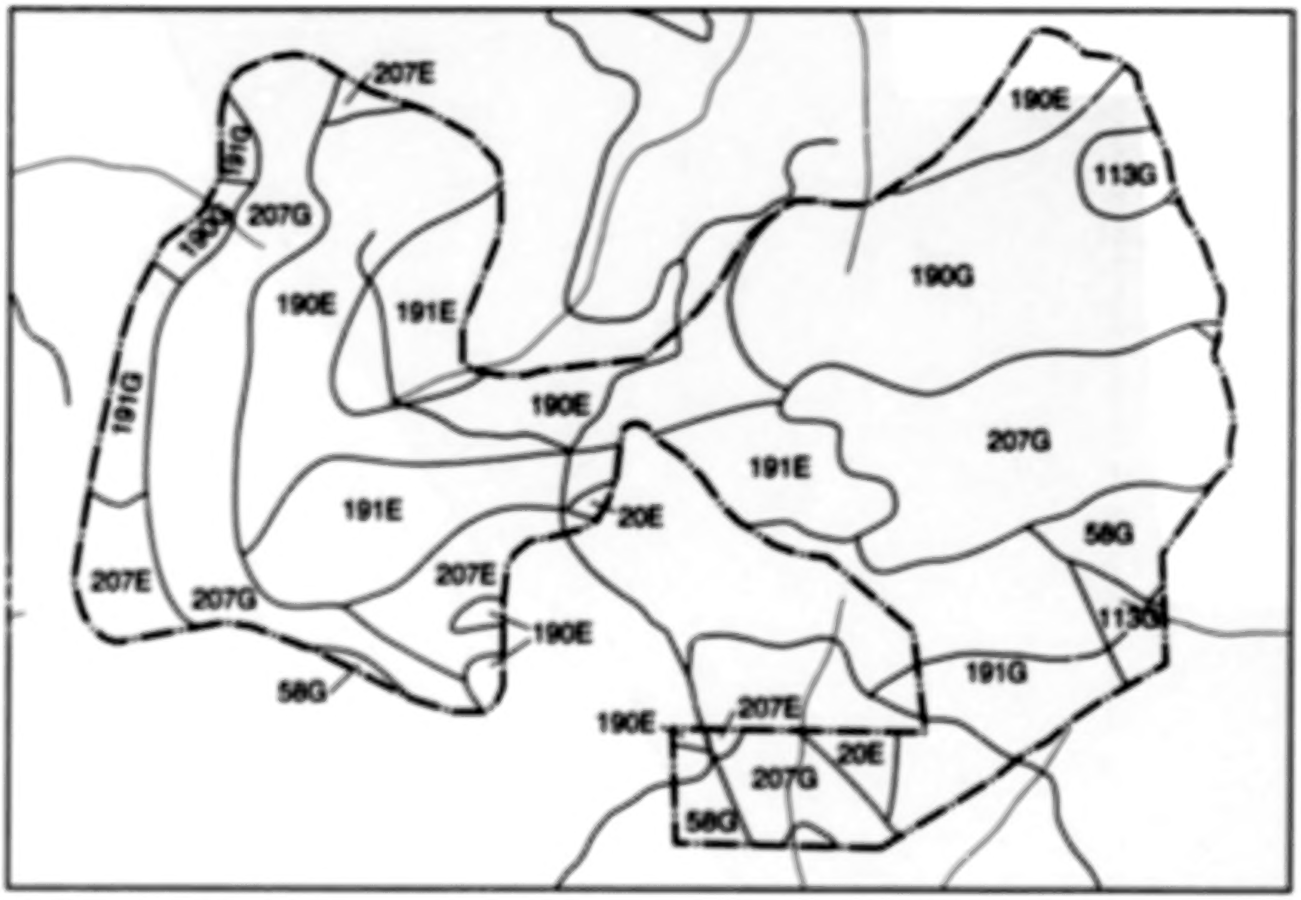
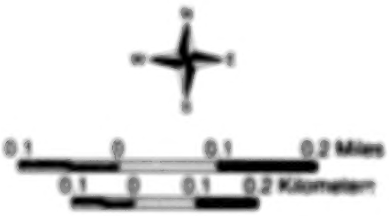
MAP 34

Cascade Siskiyou Ecological Emphasis Area
Soils of Pilot Rock ACEC (Pilot Rock Unit)





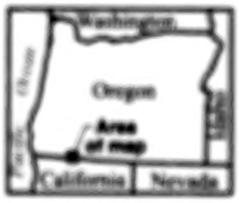
LEGEND

Soil Type Boundary--see Table 2-32 for Soil Description

Pilot Rock ACEC Boundary (Pilot Rock Unit)

Road

▭ Public Lands



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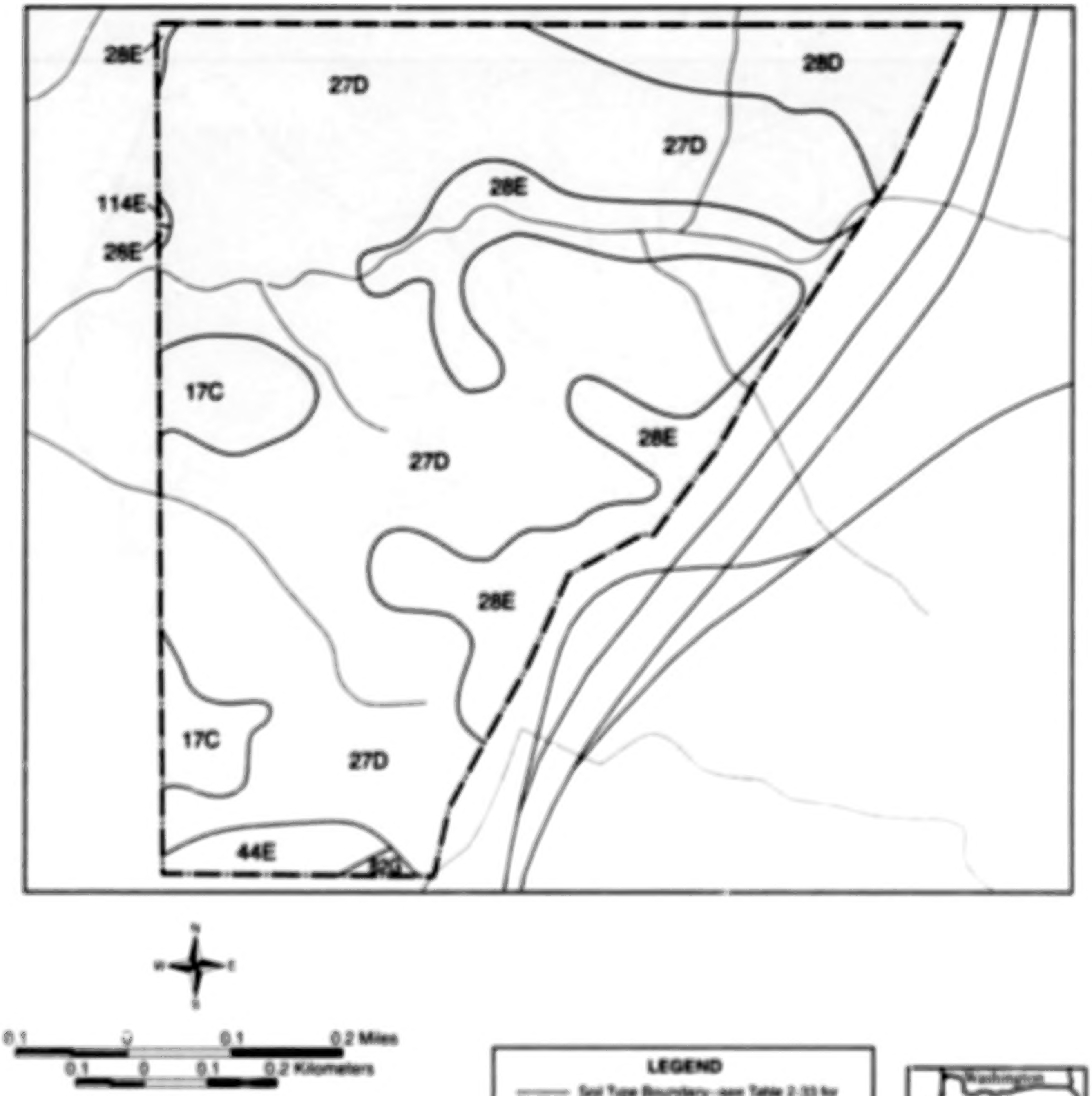
MAP 35

001-03-2000.JR

Cascade Siskiyou Ecological Emphasis Area
Soils of Pilot Rock ACEC (Mariposa Unit)



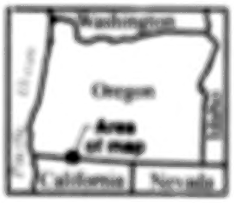
LEGEND

Soil Type Boundary--see Table 2-33 for Soil Description

Pilot Rock ACEC Boundary (Mariposa Unit)

Road

Public Lands



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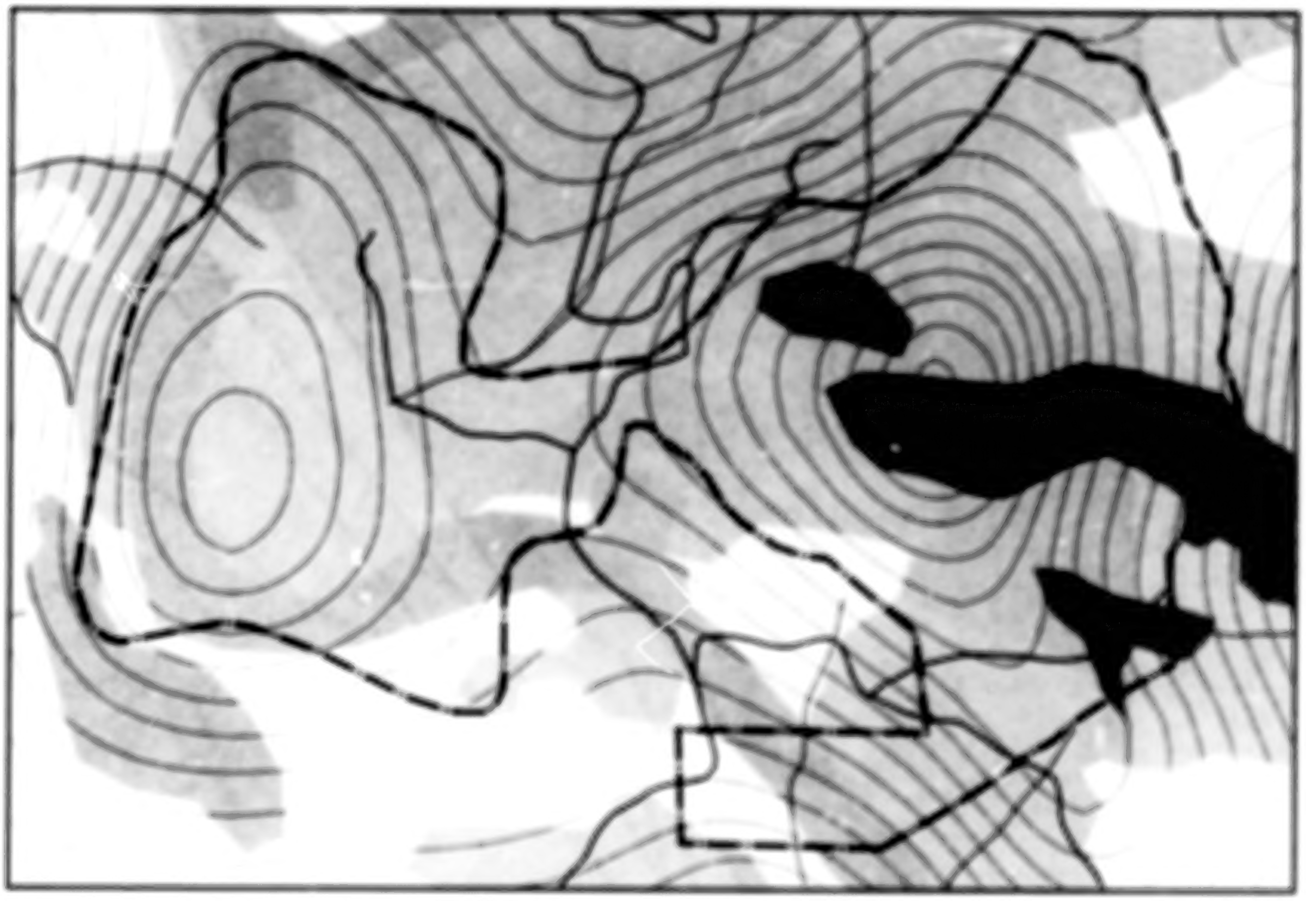
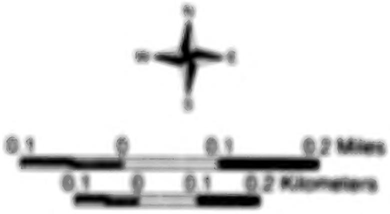
MAP 36

Cascade Siskiyou Ecological Emphasis Area
Distribution of Plant Communities of Pilot Rock ACEC (Pilot Rock Unit)



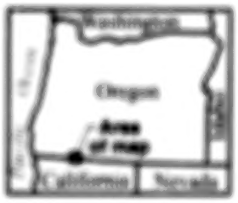


LEGEND

- Pilot Rock ACEC Boundary
- Contours, 50-Foot Interval
- Road

Plant Communities

- ▨ High-Elevation Meadow
- ■ Juniper Scabland
- ▨ Mixed Conifer
- ▨ Rocky Meadow
- ☐ Garry Oak/Klamath Plum-Meadow Complex
- ▨ Semi-Wet Meadow
- ■ Rock Outcrop



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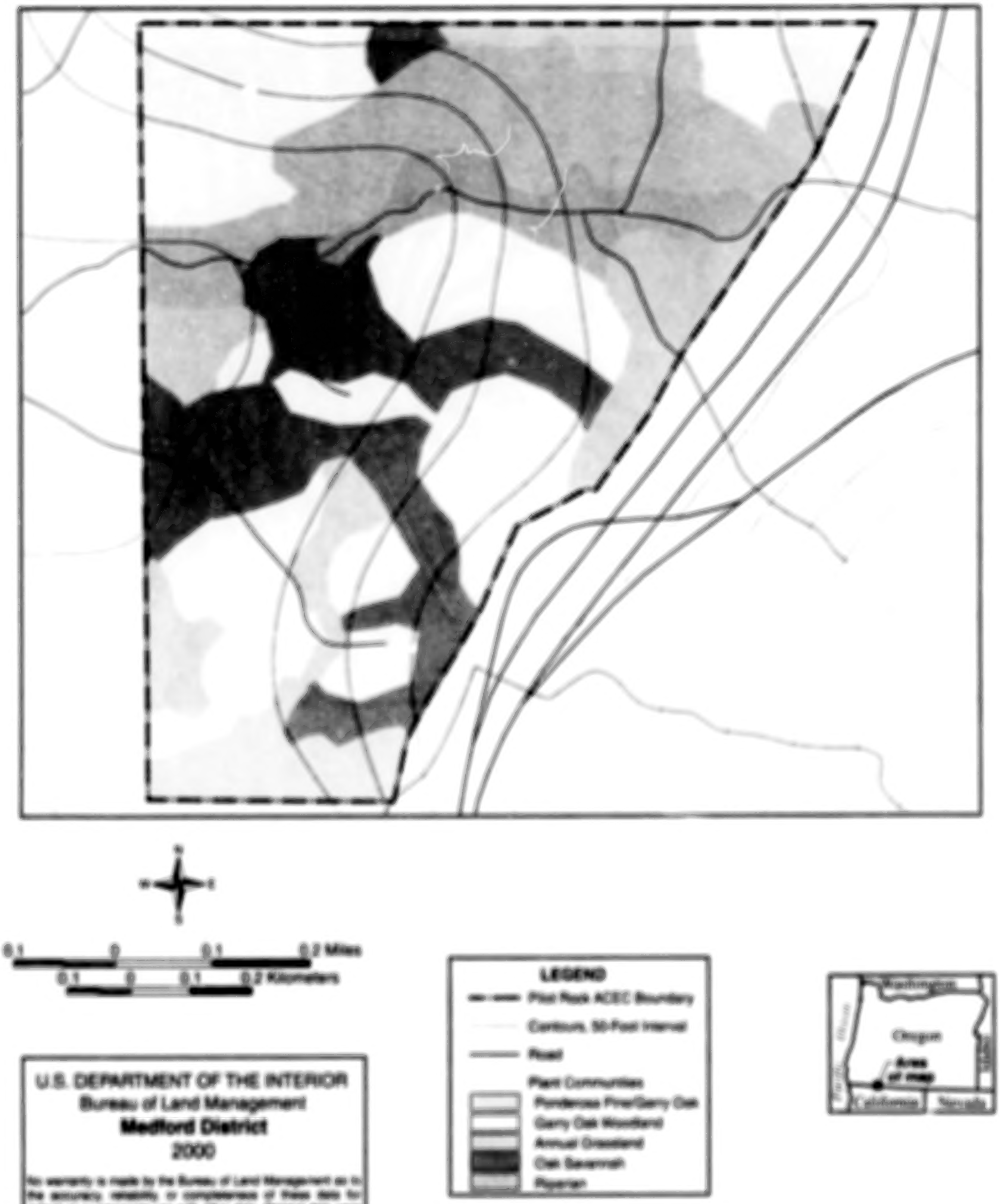
[illegible]

MAP 37

[illegible]

Cascade Siskiyou Ecological Emphasis Area
Distribution of Plant Communities of Pilot Rock ACEC (Mariposa Unit)



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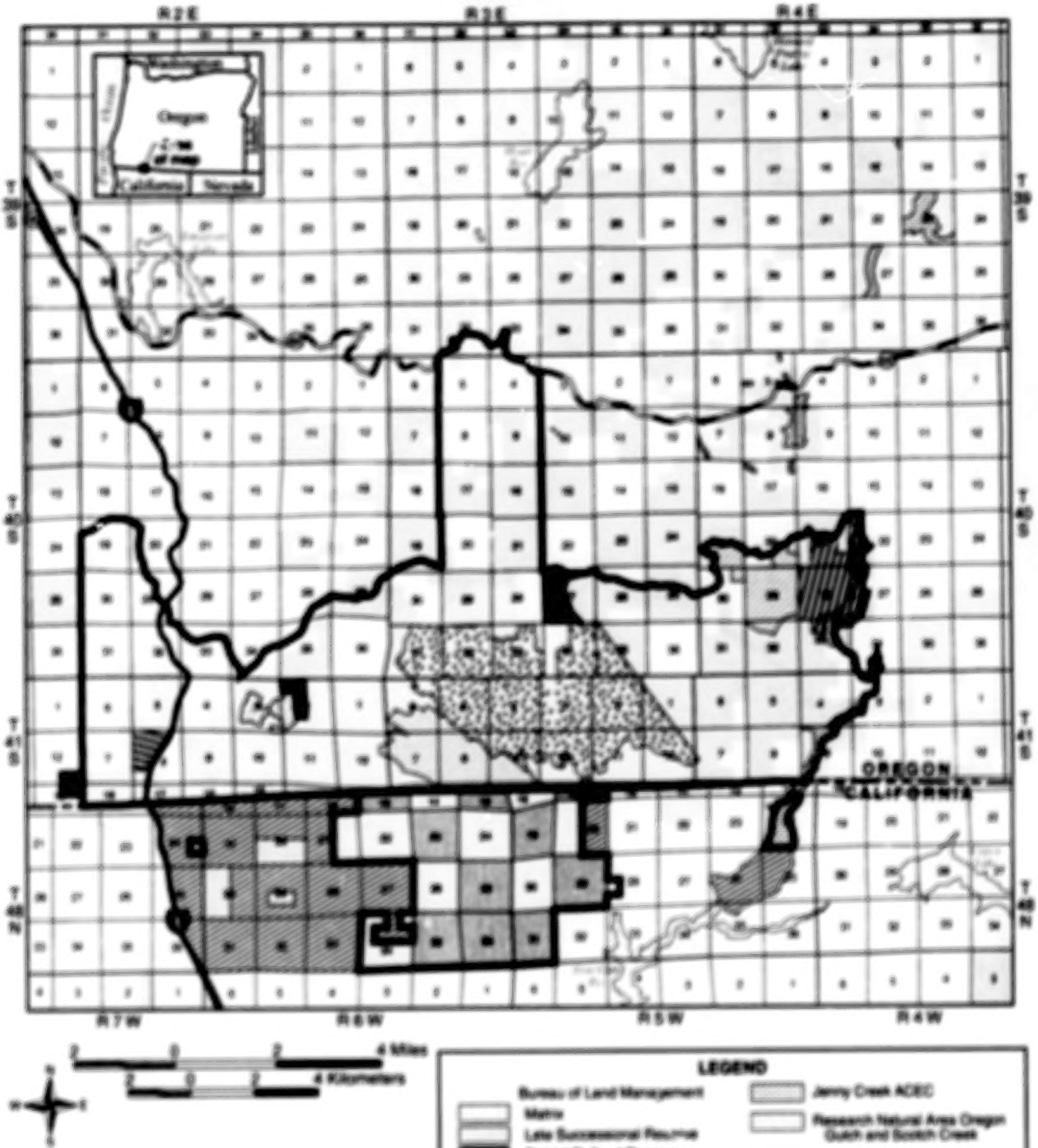
[illegible]

MAP 38

[illegible]

Cascade Siskiyou Ecological Emphasis Area
Alternative A



LEGEND

Bureau of Land Management
- ☐ Matrix
- ▭ Late Successional Reserve
- ■ District Defined Reserve
- ▭ U.S. Forest Service
- ▨ State of California
- ☐ Private
- ▦ Wilderness Study Area
- ▨ Mariposa Botanical Unit
- ▨ Jenny Creek ACEC
- ☐ Research Natural Area Oregon Gulch and Scotch Creek
- ▦ Pilot Rock ACEC
- ▥ Box-O Ranch
- ■ In the Process of BLM Aquisition
- ▨ Consider for BLM Aquisition
- — Alternative A Boundary

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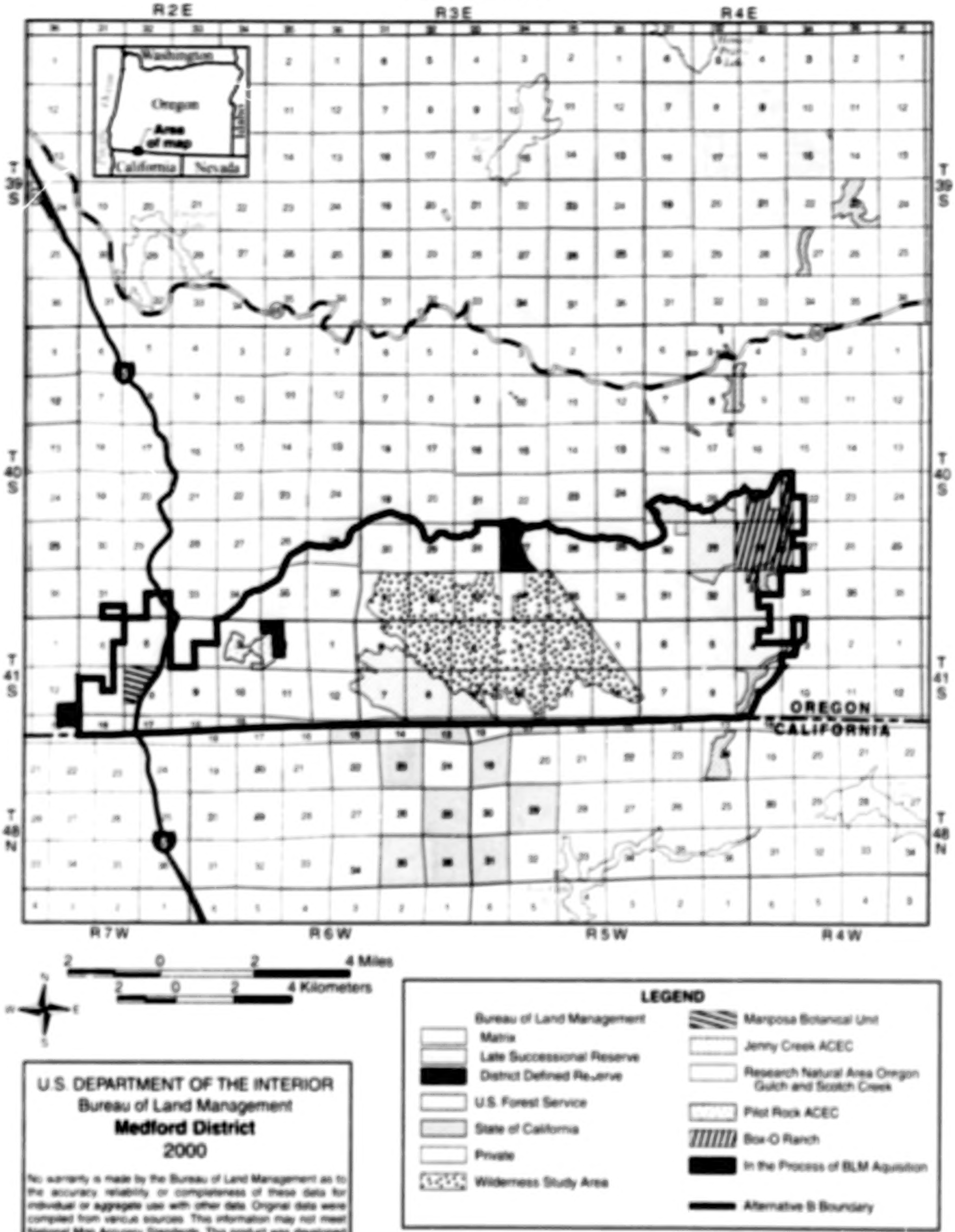
[illegible]

MAP 39

[illegible]

Cascade Siskiyou Ecological Emphasis Area
Alternative B



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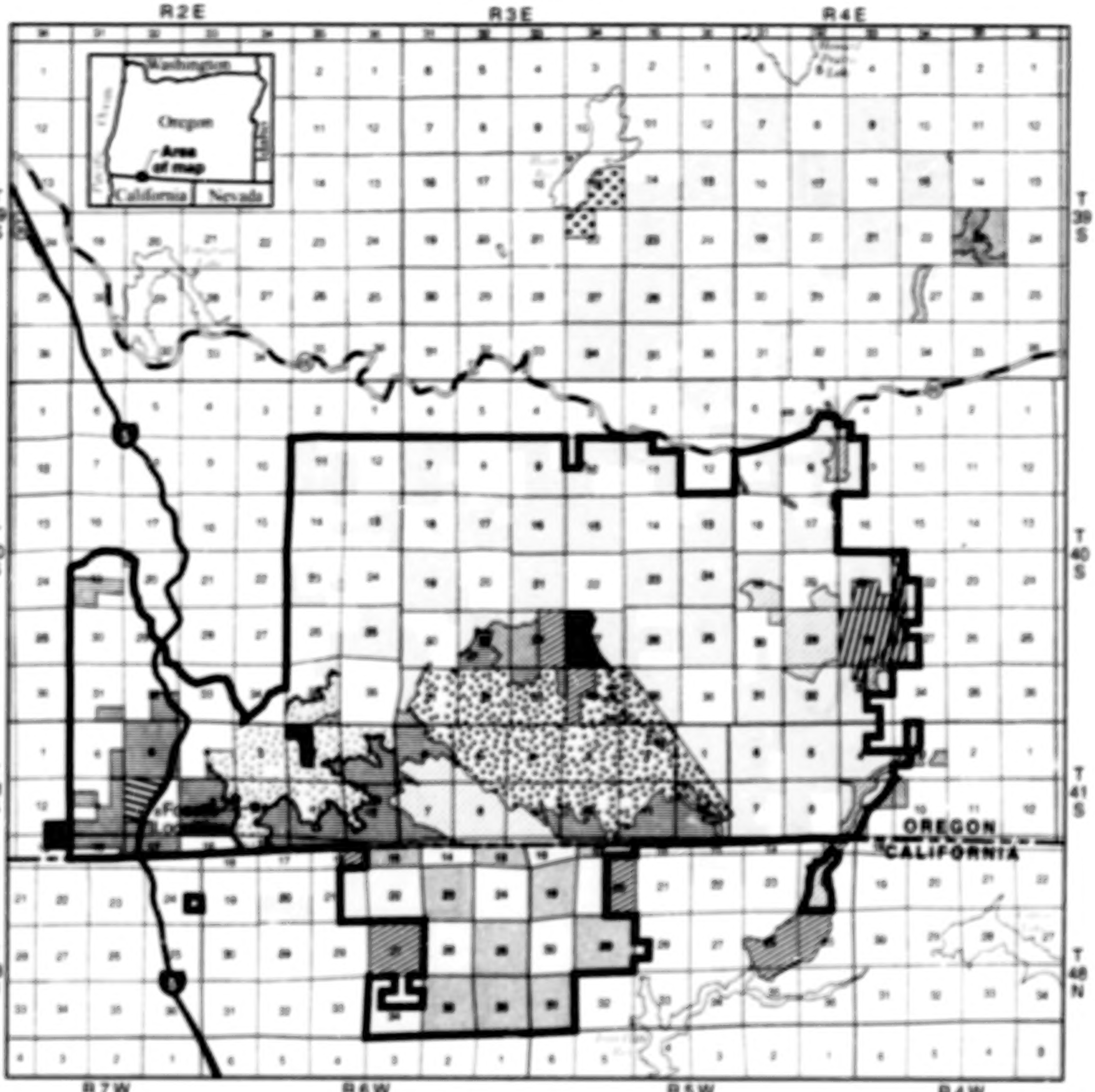
MAP 40

/cswada usr3/workarea/cswada/csweanow/map40.aml

001-03-2000 JR

Cascade Siskiyou Ecological Emphasis Area
Alternative C


R2E
R3E
R4E
T 39 S
T 40 S
T 41 S
T 48 N
R7W
R6W
R5W
R4W
OREGON
CALIFORNIA
Washington
Oregon
Idaho
Area of map
California
Nevada
2 0 2 4 Miles
2 0 2 4 Kilometers
N
W
E
S
LEGEND
Bureau of Land Management
Matrix
Late Successional Reserve
District Defined Reserve
U.S. Forest Service
State of California
Private
Wilderness Study Area
Mariposa Botanical Unit
Jenny Creek ACEC
Research Natural Area Oregon Gulch and Scotch Creek
Pilot Rock ACEC
Box-O Ranch
In the Process of BLM Aquisition
Consider for BLM Aquisition
Matrix or District Defined Reserve to Late Successional Reserve
Late Successional Reserve to Matrix
Matrix to District Defined Forest Health Reserve
4,400-Foot Elevation Contour
Alternative C Boundary

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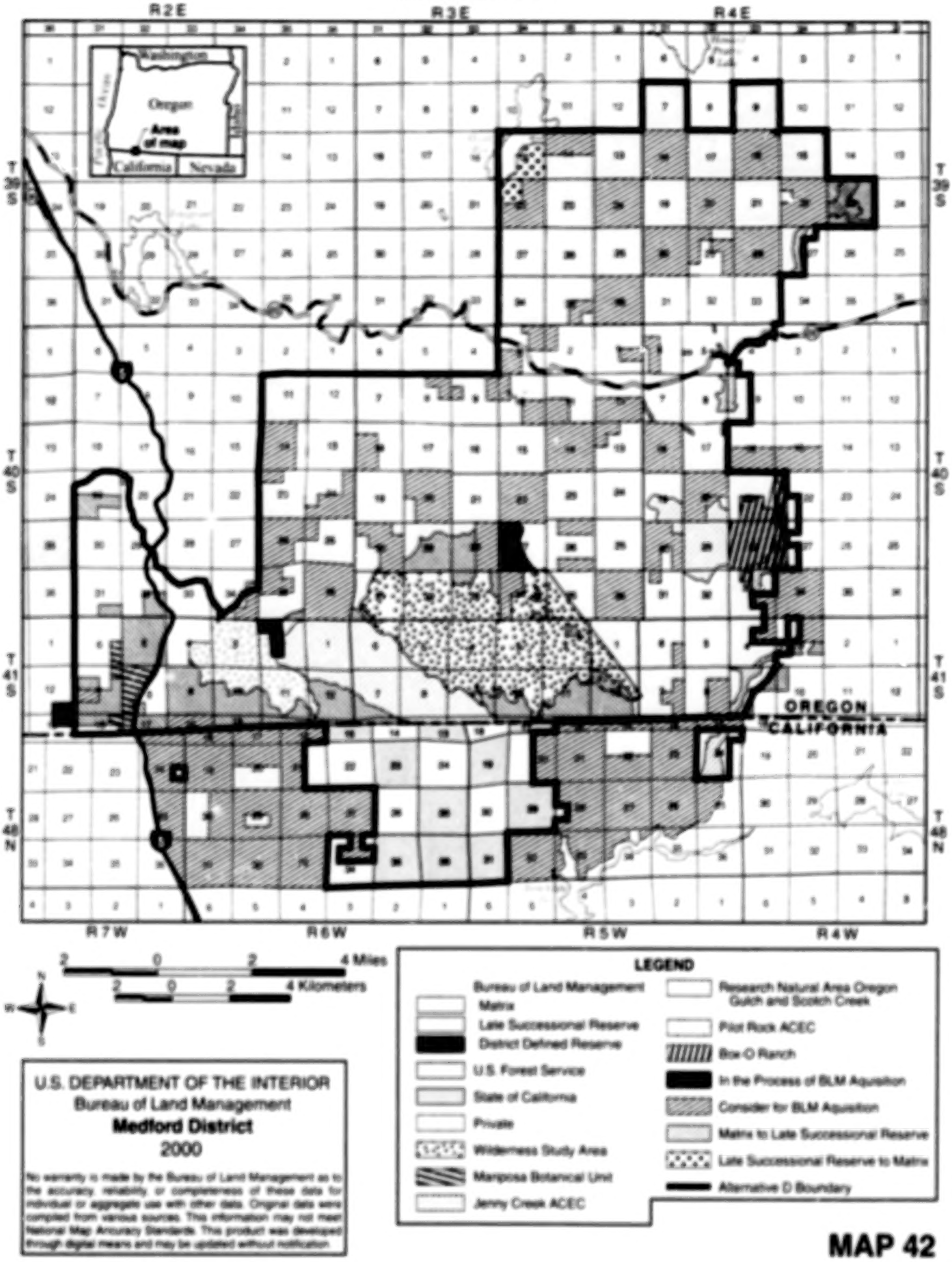
MAP 41

(zowada: usr3/workarea/zowada/caesanew/map41.aml)

D01-03-2000 JR

Cascade Siskiyou Ecological Emphasis Area
Alternative D



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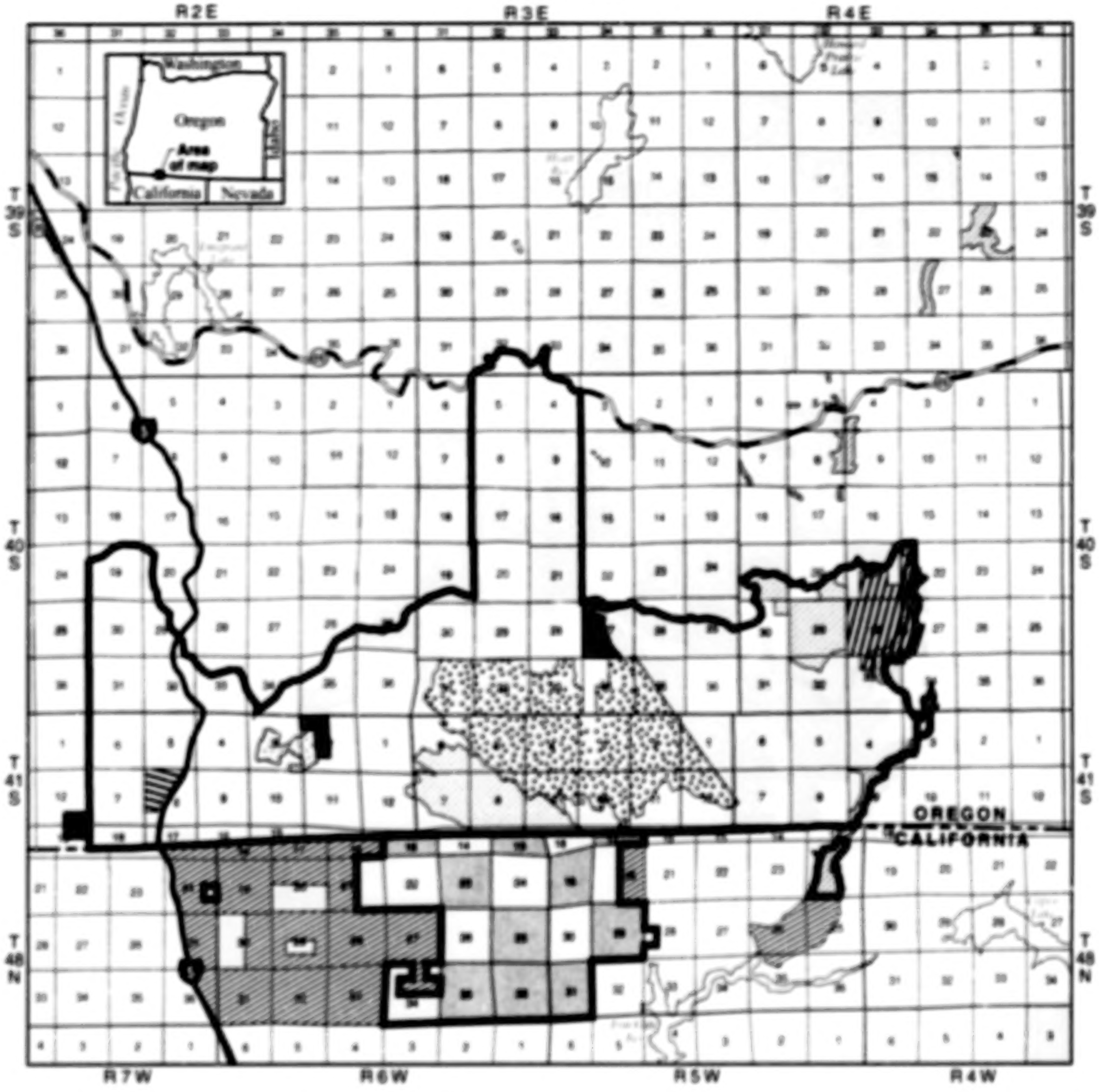
MAP 42

/cswade usr3/workarea/cswade/csesanew/map42.aml

D01-03-2000 JR

42

Cascade Siskiyou Ecological Emphasis Area
Alternative E



2 0 2 4 Miles
2 0 2 4 Kilometers

N W E S

LEGEND

Bureau of Land Management

☐ Matrix	▨ Jenny Creek ACEC
☐ Late Successional Reserve	☐ Research Natural Area Oregon Gulch and Scotch Creek
■ District Defined Reserve	☐ Pilot Rock ACEC
☐ U.S. Forest Service	▨ Box-O Ranch
▨ State of California	■ In the Process of BLM Aquistion
☐ Private	▨ Consider for BLM Aquisition
▨ Wilderness Study Area	— Alternative E Boundary
▨ Mariposa Botanical Unit	

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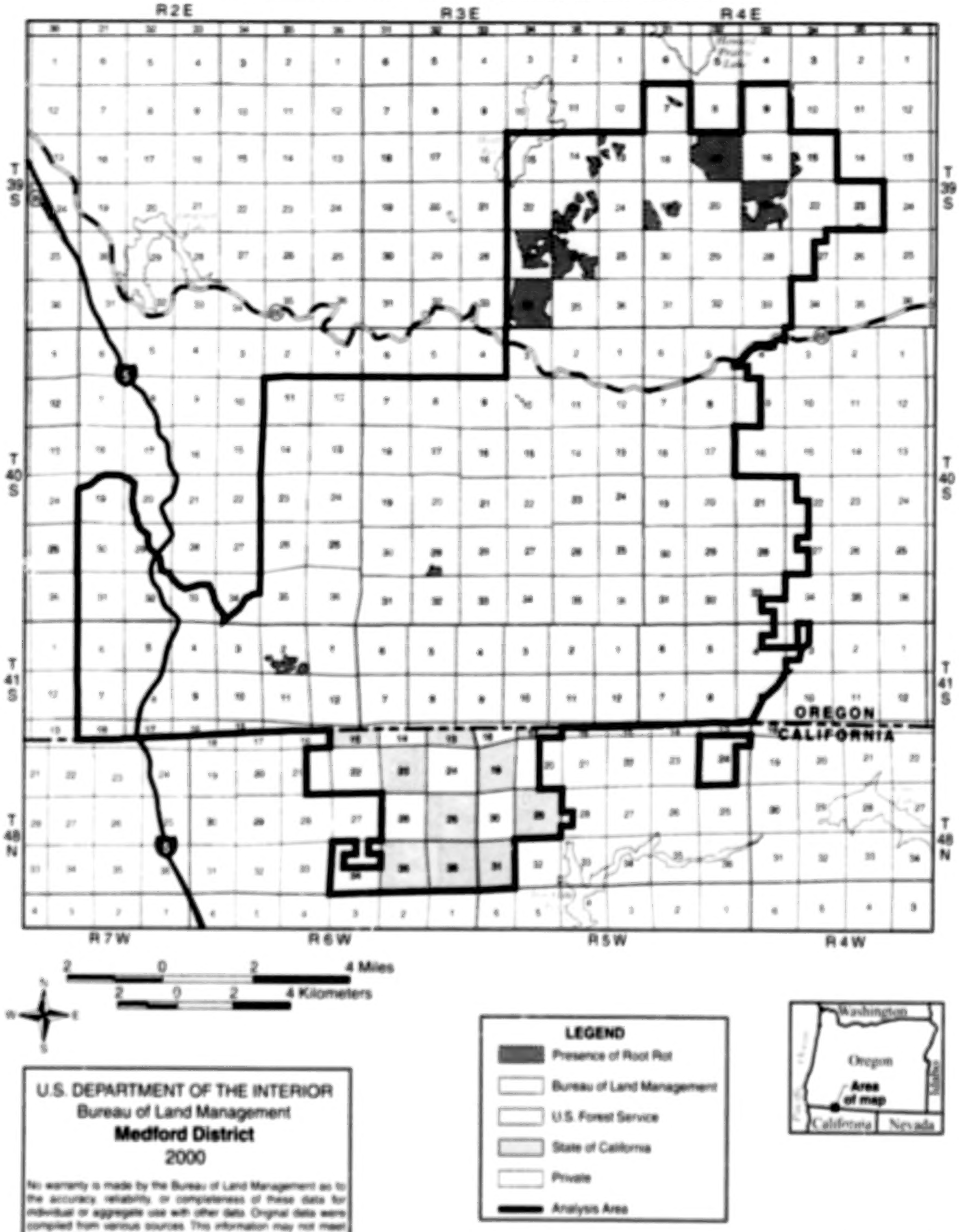
MAP 43

/cowade: usr3/workarea/cowade/casesnew/map43.aml/

D01-03-2000 JR

43

Cascade Siskiyou Ecological Emphasis Area
Laminated Root Rot Presence in the CSEEA



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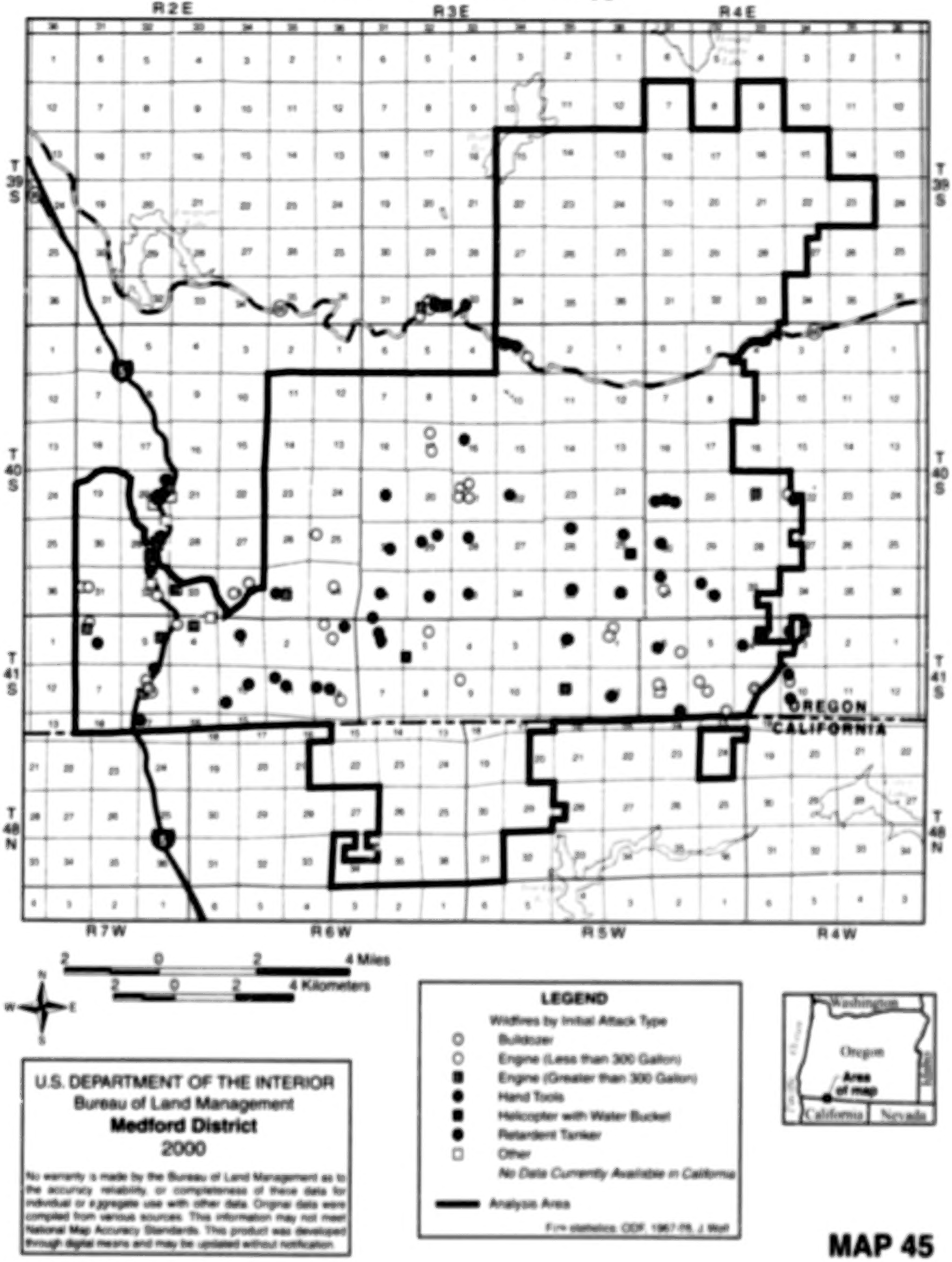
MAP 44

D01-03-2000 JR

bowada: usr3/workarea/bowada/cseeanew/map44.aml

44

Cascade Siskiyou Ecological Emphasis Area
Initial Wildfire Attack Type



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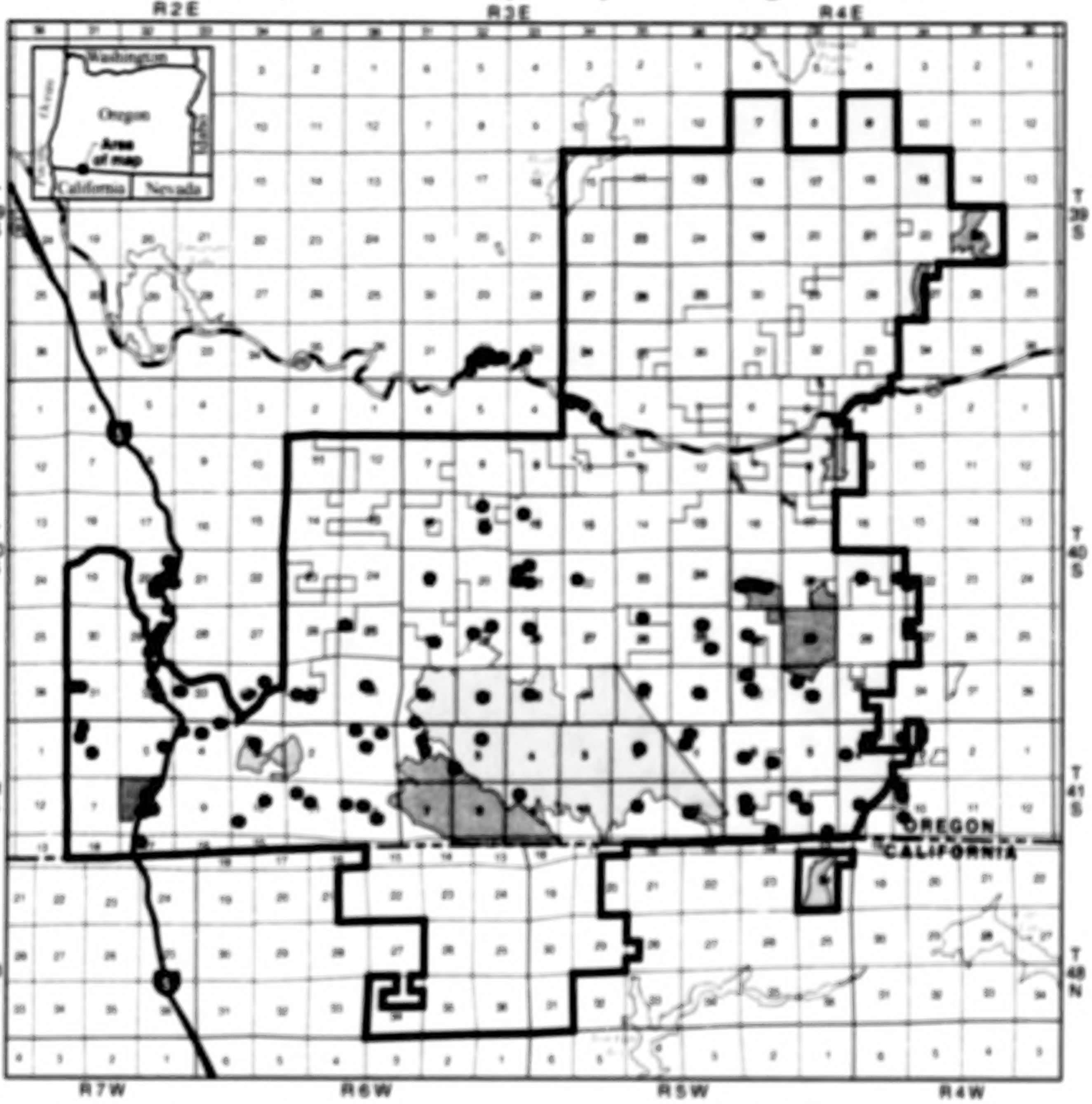
photan: /firegrag/csiutcde.apr

MAP 45

D01-03-2000 JR

45

Cascade Siskiyou Ecological Emphasis Area
Wildfire by Land Ownership and Special Management Area



2 0 2 4 Miles

2 0 2 4 Kilometers

N W E S

LEGEND

Wildfires by Land Ownership, 1967-98

● Bureau of Land Management

● Private

Special Management Areas

▨ Area of Critical Environmental Concern

☐ Box O Ranch

☐ Jenny Creek Late Serial Reserve

■ Mariposa Lily Preserve

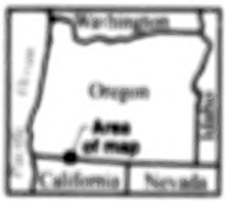
▨ Research Natural Area

☐ Wilderness Study Area

No Data Currently Available in California

━ Analysis Area

Fire statistics: ODF, 1967-98, J. Wolf



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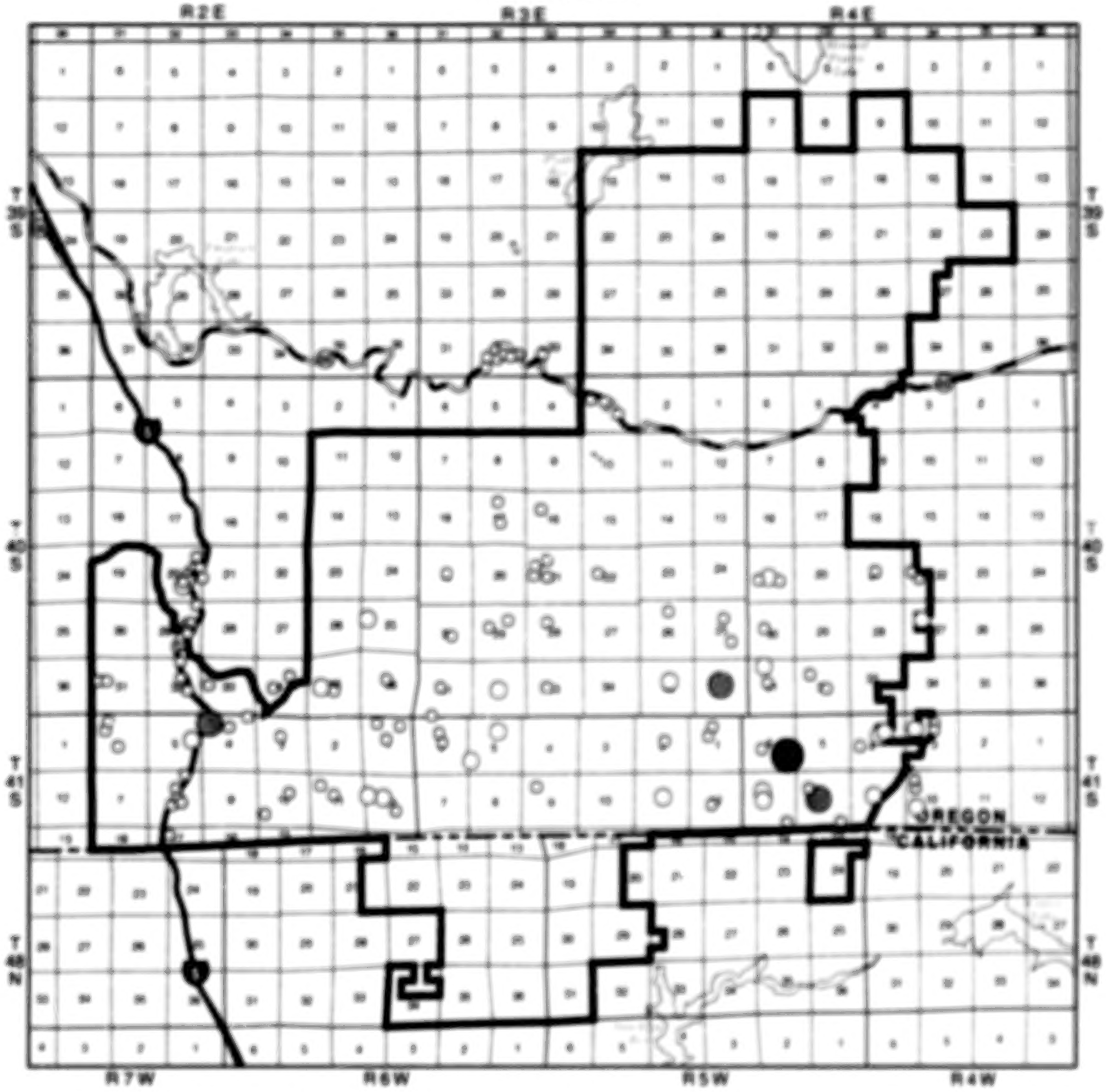
MAP 46

phoslan: /fvagreg/ordapaul.apr

D01-03-2000 JR

Cascade Siskiyou Ecological Emphasis Area
Wildfire Size



LEGEND

Wildfire Size in Burned Acreage, 1967-98

○ 0 to 0.75

○ 0.26 to 10

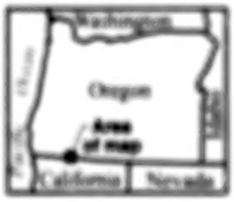
● 10.01 to 100

● Greater than 100 (actual value listed)

No Data Currently Available in California

▬ Analysis Area

Fire statistics: ODF, 1967-98, J. Wolf



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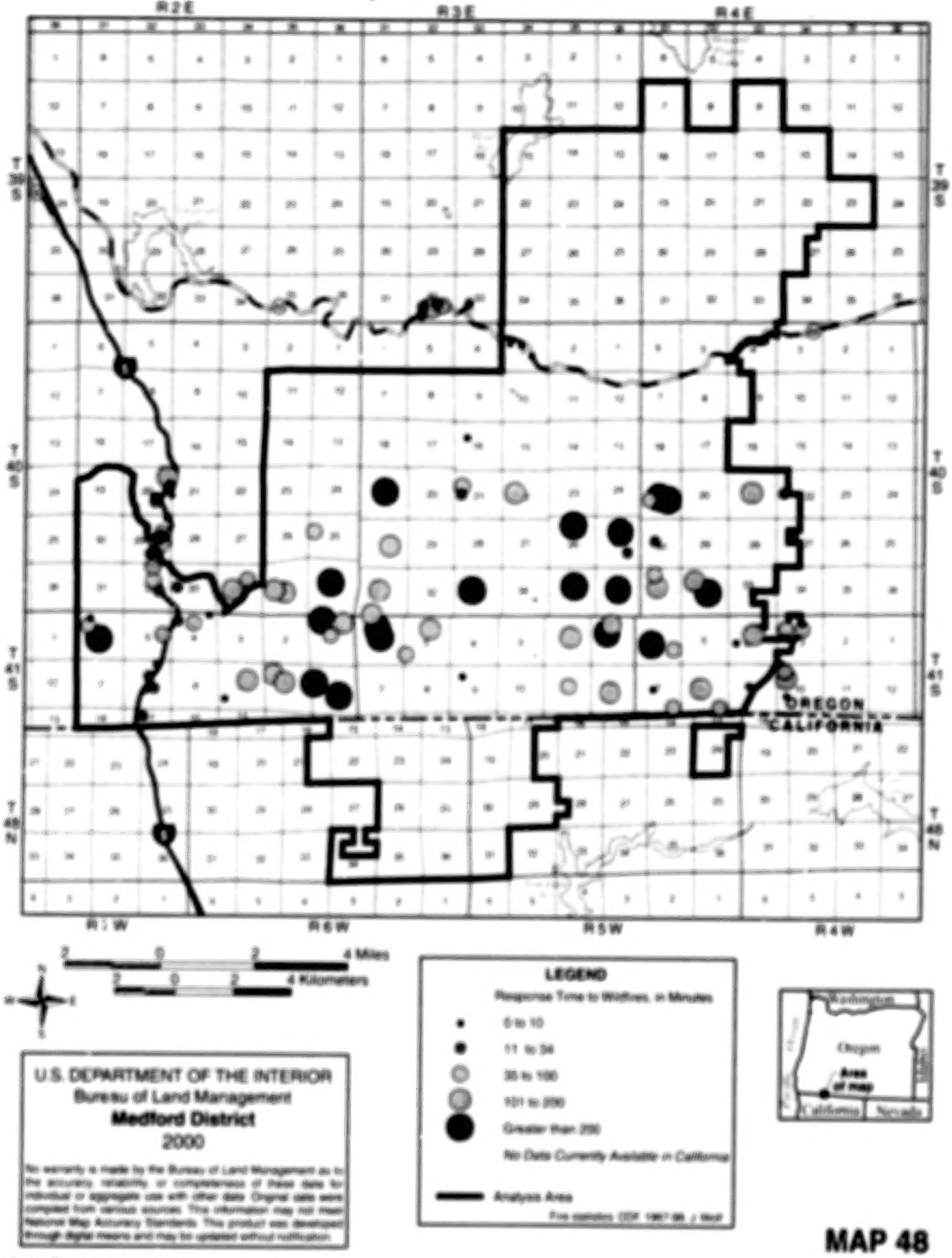
MAP 47

061-03-2000.JR

47

Cascade Siskiyou Ecological Emphasis Area
Response Time to Wildfires



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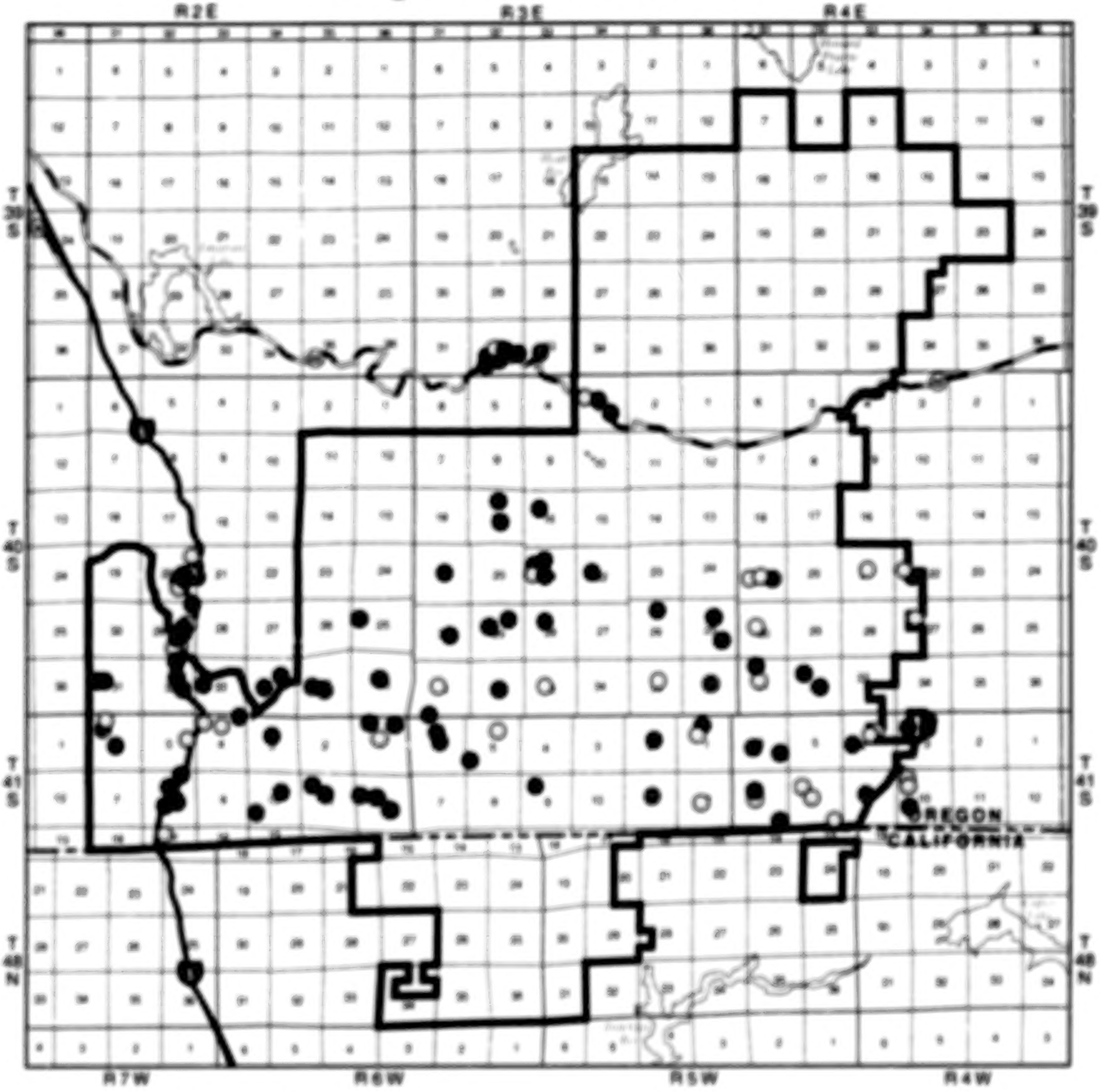
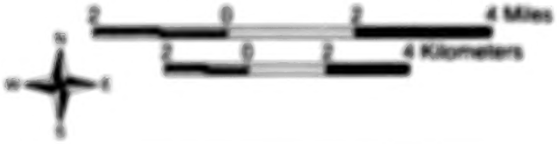
MAP 48

001-03-2000 JR

Cascade Siskiyou Ecological Emphasis Area
Danger Classification of Wildfire





LEGEND

Danger Classification of Wildfire 1967-98

● Extreme

○ High

● Moderate

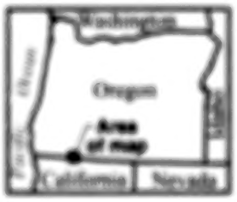
● Low

● Not During Fire Season

No Data Currently Available in California

▬ Analysis Area

Fire statistics: ODF, 1967-98, J. Wolf



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MAP 49

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Appendices

Appendix A - Memoirs of George Wright

Plant Community History

The non-conifer plant communities, (*i.e.* grasslands, shrublands, and woodlands) share several disruptive forces. These include historical livestock use over the past 100 years, fire suppression, road building, and consequent weed encroachment. The memoirs of George Wright provide a fascinating insight to past livestock management and plant community changes within the CSEEA.

"During the spring of 1889 and 1890 ... hundreds of cattle had just been loosed on the rangeland to graze the southward slopes of hillsides between Hornbrook and the Pilot Rock area ..." (p.4 of "The truth about Reelfoot" George F. Wright).

Prior to Purl Bean purchasing the Horseshoe Ranch in about 1890, this area in Scotch Creek had been used as a summer camp to oversee the cattle grazing on the surrounding hillsides. The ranches appeared to change hands frequently, thus Purl Bean sold the horseshoe ranch to A.B.Smith in 1900, who sold it to Everett Elmore in 1912, who in turn sold it to the Hayes brothers in 1915. The ranch changed hands several more times before George Wright recorded his musings about the area (Horseshoe Ranch January 18th 1954, #582).

Another Ranch initially homesteaded in Camp creek in the year 1865 was home to 300 cattle when sold in 1932 by the De Soza family (The De Soza Ranch, January 22, 1954 #591).

The Madero ranch, located where Pine Creek joins Camp Creek, had 100 cattle with saddle and draft horses (The Madero Ranch, January 23, 1954 #592).

William A. Wright established his ranch where Salt Creek empties into Camp Creek in 1879. He was an active fellow, fenced off his 160 acre homestead, leased and fenced an adjoining section of land. He married in 1885, and had 6 children. He raised alfalfa hay and kept 300 cattle. (The McNew ranch, January 25, 1954 #594).

The left fork of Camp Creek is to the west of Bald Mountain. "Years ago, the area produced lots of grass which made it good range for cattle but it is not nearly as good now as it used to be ... now the grass is about gone and is becoming, like many other things, just a memory" (The left fork of Camp Creek, January 29, 1954 #600).

The area [Lone Pine Ridge] in the early days was a fine winter and spring range for cattle and horses because there was always a good supply of bunchgrass growing on the hillsides. Roaming bands of horses depleted the bunchgrasses but most of them have been rounded up so maybe the good old bunchgrass will get a second chance" (Lone Pine Ridge, January 29 1954 #601).

Referring to a cold spring on the southeast foot of Timber Mountain, George Wright mentions that "sheep men with their herd of sheep camped there thirty or forty years ago. The sheep killed about all the good grass ... (Timber Mountain, February 3 1954 #610)."

Years ago there was a sheep camp during the summer months on the west side of Bald [Soda] Mountain ... The Bald Mountain area was a wonderful place for grass but the sheep men would herd their sheep there year after year until the grass was killed out. Weeds of different kinds have taken the place of the grass. About 1923 after the sheep had ruined the range, the cattlemen banded together and bought the sheep camp and the land, probably 160 acres. They also leased more land around there in order to keep the sheep men away. (Bald Mountain, February 6, 1954 #614).

The name Salt Creek was derived from the fact that Charles M. Marsue provided a salt lick for his cattle. A corral was built to enclose cattle that had gone wild in that area prior to 1875 (Salt Creek, February 6 1954 #617).

The ridge between Camp Creek and Salt Creek became known as the Salt Creek ridge by the mid 1940's. George Wright reports that "It used to be a good place for deer and many big bucks have been taken there in past years. The upper part of the ridge was a good horse range but since the fine bunch grass has been killed out on the knolls and ridges the range horses are about a thing of the past" (Salt Creek Ridge February 6, 1954 #618).

George Wright reports that the plow land on Cold Spring Flat (Agate Flats) was sown with rye in the late 1880's (Cold Spring Flat, February 19 1954 #634). The Cold Spring was also a "watering place for cattle and horses. They came there by the hundreds." (Cold Spring February 20, 1954 #639).

George Wright refers to a livestock Ranch up Skookum Creek dating back to the 1900s (Whites Pasture, February 21, 1954 #641). Also reports a corral along the upper part of Skookum Creek for the purpose of corralling wild cattle (John's Camp February 22 1954 #645).

"Skookum ridge was a good cattle range but due to overgrazing is not near as good now" (Skookum Ridge, February 26, 1954 #651).

George Wright refers to a goat camp on the north side of Skookum ridge ... "too many goats and cattle killed out most of the grass" (The Goat Camp March 18, 1954 #680).

Kein Creek ... "around forty or more years ago that was a fine cattle range, but is not near so good now" (May 1929, 1954 Kein Creek # 688).

Appendix B - Soil Characteristics Table

Table AB-1. Soil Characteristics of the CSEEA

Map Unit #	Soil Series Name	Soil Depth	Surface Texture	Subsoil Texture(s)
14	Bogus	60+"	v. gravelly loam	clay loam
18	Bybee	60+"	loam	clay
19/20/ 190/191	Tatouche	60+"	gravelly loam	clay
24	Campfour	60+"	loam	clay loam
24	Paragon	20-40"	cobbly loam	gravelly clay loam
27	Carney	20-40"	clay	clay w/water table
28	Carney	20-40"	cobbly clay	clay w/water table
57/58/60	Farva	20-40"	very cobbly loam	cobbly loam
78	Greystoke	40-60"	stoney loam	ex.gr.clay loam
81	Heppsie	20-40"	clay	clay, stoney clay
82/113/ 116/125	McMullin	<20"	gravelly loam	gr.clay loam
84	Hobit	20-40"	loam	gr.clay loam
96	Kanutchan	40-60"	clay	clay
114/116/119	McNull	40-60"	clay loam	cobbly clay
119	Medco	20-40"	cobbly clay loam	clay
128	Medford	60+"	clay loam	clay
143	Pinehurst	60+"	loam	clay loam
145	Greystoke	40-60"	stoney loam	ex.gr.clay loam
152	Randcore	<12"	ex.stoney loam	loam
152	Shoat	20-40"	loam	loam
160	Rustlerpeak	20-40"	gravelly loam	cobbly clay loam
167	Sibannac	60+"	silt loam	clay loam
170/173	Skookum	20-40"	very cobbly loam	very cobbly clay loam
180	Steinmetz	60+"	sandy loam	sandy loam
207	Woodseye	<20"	very stoney loam	very cobbly loam

Appendix C -- Plant Community Description

Frameworks for Plant Community Description

Several plant community classification systems are pertinent to the analysis area (table AC-1). Few classification systems cover all communities/associations falling within the general categories of grasslands, shrublands, woodlands and conifer communities (map 3). Most classification systems do not describe the range of plant communities within the study area adequately, since the classification systems were developed using data collected outside of the analysis area. While the satellite derived data is synoptic, the information classes may not fit local plant communities because of a lack of local validation. Satellite information classes usually do not define plant communities on a plant species basis, but are able to distinguish between different life-forms or growth forms.

Franklin and Dyrness (1973) and its supplement (Franklin and Blinn 1988) have been the standard reference for the vegetation of Oregon and Washington. Their discussion is organized by geographically-distinguished forest zones and geographic provinces. Discussion of the Rogue and Umpqua valleys' vegetation is presented in a major section, referred to as the Interior Valleys of western Oregon that also includes the Willamette Valley. In the Forest Zones of southwest Oregon section, they recognize the Mixed Evergreen (Pseudotsuga-Sclerophyll) Zone, the Mixed Conifer (Pinus-Pseudotsuga-Libocedrus [Calocedrus]-Abies) Zone, the Abies concolor Zone, and the Abies magnifica shastensis Zone. Each zone is further subdivided into plant communities or associations.

Three of the Franklin and Dyrness zones are located in the analysis area, the Interior Valley, the Mixed Conifer, and the Abies concolor zones. Although elevations reach 6,000 feet (6,134 feet Chinquapin Mountain and 6,089 feet at Soda Mountain), climate and topography precludes stands of Abies magnifica var shastensis. White fir (Abies concolor) is found at all but the lowest elevations.

Atzet et al. (1996) produced a field guide to forested plant association of the Rogue, Siskiyou, and Umpqua National Forests in southwestern Oregon. Their two-level classification replaces the zones of Franklin and Dyrness (1973) with vegetation series based on the dominant, most shade tolerant, regenerating species on the site. Each series is further subdivided into plant associations. Their plant association key can be used to identify potential vegetation on undisturbed or minimally disturbed sites.

However, there are some problems with this scheme as applied to the (Atzet et al.,1996). It does not cover series that are non-forested, such as grasslands, brush fields, or series like western juniper that are on the eastern margin of the planning area. Of the 15 forested series, 4 are found in the proposed CSEEA: Oregon white oak (Quercus garryana), ponderosa pine (Pinus ponderosa), Douglas-fir (Pseudotsuga menziesii), and white fir (Abies concolor). None of their sample sites were located in the CSEEA.

Based on the vegetation of California, Sawyer and Keeler-Wolf (1995) offer a further refinement in classification by covering a number of non-forested vegetation series. There is a serious philosophical feature that distinguishes Sawyer and Keeler-Wolf's work from that of Atzet et al. (1996). Atzet et al. classification is based on the concept of potential vegetation, while Sawyer and Keeler-Wolf describe what is growing on the site at the time of data collection. The potential vegetation concept used by Atzet et al. attempts to estimate the climax vegetation of a site after 500 years without disturbance (fire, disease, floods, wind, human intervention) by taking into account ecological succession. Sawyer and Keeler-Wolf and many vegetation mapping schemes "describe what you see" (Zedler 1997).

Kagan and Caicco (1996) developed the Manual of Oregon Actual Vegetation as part of the Oregon Gap Analysis Program to determine the biodiversity in nature reserves and in areas managed for their natural values. They developed their map from 1988 LANDSAT imagery and reflects the actual vegetation of the time rather than potential vegetation. The manual groups 133 primary vegetation types into 5 cultural land cover types, 7 natural land cover types, and 54 vegetation complexes. The manual describes each vegetation type by providing detailed floristic lists of the species that characterize the type arranged by diagnostic importance as trees, shrubs, forbs, grasses, and ferns and allies. A description of the vegetation, statement of distribution, elevational range, and map names are also provided. The GAP analysis map for Oregon is being updated and is currently unavailable.

The work of Fox et al. (1997) is another potential source of information. They have developed a database and map of existing vegetation in the Klamath Bioregion in northern California and southern Oregon based on LANDSAT imagery. The structural vegetation patterns and land conditions were classified in a modified California Wildlife Habitat Relationships (WHR) Systems that indicates habitat type (based on vegetation) by size class and crown closure for both public and private land. The classification based on LANDSAT imagery broadly distinguishes types at the level of Mixed Conifer (Fir or Pine), Mixed Conifer-Hardwood, Hardwood-Mixed Conifer, Mixed Hardwood, Greenleaf Shrub, Deadstick Shrub, Dead Grass/Forb, for example. The map is not yet available.

Thompson and Drewein (1983) reported the results of a soil/vegetation inventory to use as a tool in implementing rangeland resources in the southwest Cascades in the Ashland Resource Area. They sampled rangeland and forested sites for rangeland condition, suitability, soil correlation and productivity. For each site write-up area (SWA) the following observations were recorded at each site: soil unit identification, range site identification, vegetation strata identification, production capability, aspect and slope, suitability for grazing, acreage of the unit, and apparent trend [in range condition]. Approximately 7,000 SWAs were described to serve as the basis for a vegetation map of the area. They recognized the following vegetative zones with in the proposed CSEEA: Klamath Dry Upland, Rogue Dry Upland, Soda Mountain/Table Mountain High Country, Parker Mountain Sugar Pine, and some elements of the Klamath County Vegetation Zone near Jenny Creek.

Thompson and Drewein (1983) were further able to distinguish a series of Range Sites within the proposed CSEEA that include: Steep Foothill Grasslands, Steep Mountain Grassland, High Mountain Grassland, Dry Meadow, Semi-wet Meadow, Shrubby Scabland, Mahogany-Oak Fescue, Oak-Pine-Fescue, Oak-Pine-Oatgrass, Pine-Oak-Fescue, Douglas-fir Forest, Douglas-fir Mixed Pine, Mixed Fir-Mixed Pine, Mixed Fir-Oceanspray, and White Fir Forest. These vegetation types are described below.

The Natural Resource Conservation Service (NRCS), formerly known as the Soil Conservation service (SCS) completed the soil survey for Jackson County in 1993 (SCS 1993). Potential plant communities (table AC-1) and idealized plant composition (based on canopy cover) are defined for each soil type. Plant community-soil relationships are generalized. This means that areas that have been altered (e.g., for pasture production, or timber harvest, or weed invasion) are not represented. Generalized county wide soil-plant community relationships also mean that site specific predictions of plant community are not always accurate. Nevertheless, grouping similar plant communities into coarser units, defined by map 3, provide a realistic picture of broad plant communities across the landscape, including public and private lands.

Except for the work of Fox et al. (1997) various aspects of the previous vegetation schemes have been used in the following description of the vegetation.

A Description of Plant Communities

Grasslands

The best description of grassland types is by Thompson and Drewien, 1983. Slope, aspect, elevation, edaphic conditions, mineralogy, fire history, and weed invasion all play a role in creating the range of grasslands present within the analysis area. It is likely that many grasslands have converted to annual grasses and starthistle consequent to fire suppression, poor livestock management, and weed invasion. Particularly susceptible are sites with soils dominated by montmorillonitic clays. The moisture induced shrink-swell action of the clays constitutes and endogenous disturbance favoring weed invasion.

Steep Foothill Grassland

Bluebunch wheatgrass (Agropyron [Pseudoroegneria] spicata) dominate the site with variable amounts of Idaho fescue (Festuca idahoense) and Lemmon needlegrass (Stipa [Achnatherum] lemmonii). Sites occur on shallow soils on south-facing slopes that exceed 40 percent. Elevation ranges from 1,800 to 4,000 feet.

Steep Mountain Grassland

Idaho fescue (Festuca idahoense) dominates the site with variable amounts of bluebunch wheatgrass (Agropyron [Pseudoroegneria] spicata) and Lemmon needlegrass (Stipa [Achnatherum] lemmonii). Sites are located on steep (over 40 percent) south-facing slopes with shallow, rocky soils. Elevation varies from 3,000 to 5,500 feet.

High Mountain Grassland

Variable amounts of Idaho fescue (Festuca idahoense) and Lemmon needlegrass (Stipa [Achnatherum] lemmonii) dominate the sites, with minor amounts of bluebunch wheatgrass (Agropyron [Pseudoroegneria] spicata). High snow fall areas. High elevation (above 5,000 feet) with shallow rocky soils similar to Steep Mountain and Steep Foothill Grassland sites.

Dry Meadow

Flatter sites on moderately deep soils with a high shrink swell capacity. Ground vegetation consists of California oatgrass (Danthonia californica), pine bluegrass (Poa secunda [P. scabrella]), and various forbs. Meadow sites with scant canopy cover. Elevation varies from 1,600 to 6,000 feet.

Franklin and Dyrness (1973) describe several xeric meadows as special types characterized by shallow and often stony soils within the Mixed-Conifer zone. These include forest openings with exposed bedrock dominated by cryptogams; Arctostaphylos nevadensis-Ceanothus prostratus in the form of dense mats on stony sloped ground; Bromus carinatus-Stipa spp.-Sitanion hystrix Eriogonum spp-Senecio crassulus community incorporating Arctostaphyos patula; and rock bound communities dominated by Sedum oregonense, Caespitose Polygonaceae, and Xeromorphic ferns.

Shrublands

Shrublands are not adequately described within any of the conceptual frameworks defined by table AC-1. The NRCS (1993) based data generalize different shrub communities, while the SVIM data disguise shrub communities by defining their origin as being due to undesired high intensity burns or a high fire frequency. Within the SVIM system of plant community organization, the manzanita and wedgeleaf ceanothus dominated plant communities are also assumed to be part of the woodland plant community dynamics. This belies the importance of these plant communities as an integral part of the fabric of the landscape, as well as their importance to wildlife, particularly as winter browse for deer.

Within the Jenny Creek LSR portion of the analysis area, brush fields are occasionally interspersed in the oak woodlands. At lower elevations, patches dominated by whiteleaf manzanita (Arctostaphylos viscida), wedgeleaf ceanothus (Ceanothus cuneatus), and poison oak (Rhus diversiloba) are common. At higher elevations, deerbrush (C. intergerrimus), mountain whitethorn ceanothus (C. cordulatus), skunkbrush sumac (Rhus trilobata), and brown dogwood dominate the brush fields. Chokecherry (Prunus virginiana), bittercherry (P. emarginata), Klamath plum (P. subcordata), birchleaf mountain mahogany (Cercocarpus montanus), pale serviceberry (Amelanchier pallida), and yellow rabbitbrush (Chrysothamnus viscidiflorus) also make up a significant portion of the brushfield flora. This complex collection of shrubs is commonly known as Southern Oregon Chaparral.

Shrub communities occupy a greater portion of the landscape within the Agate Flats area. These shrublands frequently have a hardwood component in the form of Oregon white oak, birchleaf mountain mahogany, and the various plum species. Communities dominated by members of the rose family (plums and chokecherry (Prunus spp.), birchleaf mountain mahogany (Cercocarpus montanus), and serviceberry (Amelanchier alnifolia) are commonly referred to as rosaceous chaparral. The herbaceous component of the shrub communities are frequently dominated by annual grasses, particularly in the case of wedgeleaf ceanothus and whiteleaf manzanita domination. Starthistle infestations occur throughout the shrubland areas, doubtlessly through wind-dispersal of plumed seeds, as well as agents such as off-road vehicles, livestock, deer, elk, and hiking boots.

Woodlands

Oak woodlands in the proposed CSEEA are predominately at lower elevations and on south-facing and west-facing slopes. Oak woodlands frequently represent the major tree dominated associations of the Agate Flat portion of the proposed CSEEA (in the Lower Jenny Creek subwatershed) and on south-facing slopes of Keene Creek Ridge and Rosebud Mountain. Soils and fire have been the most frequently coarse influence. The result is a mosaic of brush fields, scattered trees, grasslands, and pockets of conifers.

The trees are predominantly Oregon white oak (Quercus garryana) with some California black oak (Q. kelloggii), Pacific madrone (Arbutus menziesii), and large scattered ponderosa pines (Pinus ponderosa), both living and dead snags, that tower above the surrounding vegetation. The understory shrubs include: deerbrush (Ceanothus intergerrimus), poison oak (Rhus diversiloba), Oregon grape (Berberis aquifolium), whiteleaf manzanita (Arctostaphylos viscida), and some bitterbrush (Purshia tridentata). The ground layer consists of various forbs and grasses that include: spreading dogbane (Apocynum androsaemifolium), hairy honeysuckle (Lonicera hispidula), Puget balsamroot (Balsamorhiza deltoidea), California fescue (Festuca californica), whiteleaf lupine (Lupinus albifrons), and several paintbrushes (Castilleja sp.). Yellow starthistle (Centaurea solstitialis) and various annual grasses, Medusa-head rye (Taeniatherum

[Elymus] caput-medusae), and bulbous bluegrass (Poa bulbosa) are well established naturalized weeds.

Oak woodlands vary from open savannas with a grass dominated understory to forest stands with intermingled Douglas-fir (Pseudotsuga menziesii) and ponderosa pine (Pinus ponderosa). On higher slopes, Oregon white oak may form solid stands of short (<6 m) trees with closed canopies intermixed with native plums and mountain mahogany. Oregon white oaks at higher elevations approach the diminished size and stature of Brewer oak (Quercus garryana var. breweri). On the flats, oak forest structure may consist of widely separated, large, old savanna-form oaks (>250 years) surrounded by numerous younger (<125 years) crowded, forest-form oaks. Savanna-form oaks are recognized by their stout trunks, broad, spreading branches, and rounded crowns. Forest form oaks have slender trunks, ascending branches and are much closer together.

Presumably, the savanna-form oaks formed under a regime of frequent light fires. The crowded forest-form oaks developed with the cessation of fire in the last 100 years that allowed seedlings to grow to maturity. Thompson and Drewien (1983) described several range sites dominated by oaks.

Mahogany-Oak-Fescue

A typically dry site with high densities of Oregon white oak and Birchleaf mountain-mahogany. Understory predominately consists of Idaho fescue (Festuca idahoense) and a variety of forbs. Soils are moderately deep with clayey subsurface horizons. Most sites occur on moderately steep to steep slopes.

Oak-Pine-Fescue

This site type occurs most typically on gently rolling hills at low elevations and on steep south facing slopes at the higher elevations. Overstory is dominated by Oregon white oak and secondary amounts of ponderosa pine. Understory is mainly Idaho fescue (Festuca idahoense) with minor densities of bluebunch wheatgrass (Agropyron [Pseudoregneria] spicata). Forbs are variable. Soils are well-drained, shallow, and rocky.

Oak-Pine-Oatgrass

Canopy cover of Oregon white oak, usually at high densities, with minor amounts of ponderosa pine. Dominant grass is California oatgrass. Soils are clayey at subsurface horizons. These sites are typically found on gentle slopes or flats at both north and south aspects.

Pine-Oak-Fescue

Overstory is dominated by ponderosa pine, Oregon white oak, and/or California black oak. Ground cover consists of high densities of Idaho fescue (Festuca idahoense). Mid-story may include birchleaf mountain-mahogany, serviceberry, and/or Klamath plum. Soils are moderately deep and are well-drained. Most sites occur on rolling hills, though some are found on steep slopes.

Conifer Communities

Mixed Conifer Zone/White Fir Series

At higher elevations, the Interior Valley Zone fades into the Mixed Conifer Zone. The demarcation between zones may be distinct or obscure. Douglas-fir, ponderosa pine, and other conifers become evident often with an increase in golden chinquapin (Chrysolepis chrysophylla), Oregon grape (Berberis aquifolium), baldhip rose (Rosa gymnocarpa), and additional ceanothus species. There is no clear transition at higher elevations between the Mixed Conifer Zone and the White Fir Zone. The Mixed Conifer Zone is found in the Upper Tyler Creek, Baldy, Middle Jenny, Keene Creek, Skookum Creek, Dutch Oven Creek, Hutton Creek and Lower Jenny subwatersheds between 2,500 and 4,200 feet elevation. The Mixed Conifer Zone landscape pattern is coarse grained because of interspersed shrublands, meadows, clearcuts, and forestland.

The Mixed Conifer Zone supports a variety of conifers including Douglas-fir (Pseudotsuga menziesii), white fir (Abies concolor), ponderosa pine (Pinus ponderosa), sugar pine (P. lambertiana), incense cedar (Calocedrus decurrens), Pacific yew (Taxus brevifolia), and western juniper (Juniperus occidentalis). Douglas-fir is the most common conifer with sugar pine, ponderosa pine, and incense cedar also present in the overstory of mature stands. In mature stands, white fir (and Douglas-fir with enough canopy gaps) dominates other understory conifers, which indicates that it is the climax species. Before 1910, more frequent fires prevented the more flammable, shade tolerant white fir from becoming a dominant climax species at lower elevations. As a result of fire cessation, a shift toward dense stands of white fir and Douglas-fir at the expense of sugar pine, ponderosa pine, and incense cedar has occurred.

Much of the Mixed Conifer Zone and all of the white fir zone in the proposed CSEEA would be classified with Atzet et al. (1996) as the white fir series which is made up of several white fir (ABCO) associations. White fir associations are recognized by a high rate of constancy (the percent of plots with a given species present) among understory trees. In some plant communities, Douglas-fir might have 100 percent constancy in the overstory but would be considered a white fir association because 100 percent constancy of white firs in the understory.

Atzet et al. (1996) WHITE FIR-INCENSE CEDAR/WESTERN STARFLOWER (ABCO 44). This association is particularly well represented in the proposed CSEEA. Douglas-fir, white fir, incense-cedar, and sugar pine are the main overstory trees. White fir is the main constituent among the understory trees and has increased to the detriment of the less shade tolerant sugar pine, Douglas-fir, and incense cedar with lack of fire as an important ecosystem factor. Sugar pine and incense cedar quickly fill in canopy gaps caused by blow-down white fir and Douglas-fir that have succumbed to Phellinus weirii and other root rot infections. Root rot play a major role in forest succession and structure. Most of the root rot is present in the northern part of the proposed CSEEA in the vicinity of Hyatt and Howard Prairie Lakes. Sugar pine in many associations often appears as the long-term dominant continuing to grow as generations of white fir and Douglas-fir perish from fire or root rot. Sugar pine usually occurs as isolated individuals and never in solid stands. White fir stocking levels have increased compared to other conifers in the area because of fire suppression and lack of Native American fire land management practice. Under even the lightest fire regimes, young white firs are fire sensitive because of low branches that sweep to the ground creating fuel ladders to the crowns and relatively thin resinous bark.

Kagan and Caicco (1996) recognize a Siskiyou-Sierra mixed conifer forest on the western slopes of the southern Cascades and in the eastern Siskiyou Mountains. They describe this forest as an open to closed canopy forest with numerous co-dominant conifers made up of a rich assemblage of trees, shrubs, and forbs. The forest type varies in elevation from 2,500 to 5,500 feet. In the proposed CSEEA, many of the Siskiyou species mentioned drop out (Port Orford-cedar and Tanbark-oak). Diagnostic trees in the proposed CSEEA include: white fir (Abies concolor), incense-cedar (Calocedrus decurrens), sugar pine (Pinus lambertiana), ponderosa pine (P. ponderosa), and Douglas-fir (Pseudotsuga menziesii). Shrubs include: vine maple (Acer circinatum), pinemat manzanita (Arctostaphylos nevadensis), little Oregon-grape (Berberis nervosa), oceanspray (Holodiscus discolor), baldhip rose (Rosa gymnocarpa), creeping snowberry (Symphoricarpos mollis), and western yew (Taxus brevifolia). Forbs include: vanilla-leaf (Achyls triphylla), threeleaf anemone (Anemone deltoidea), spreading dogbane (Apocynum androsaemifolium), bigleaf sandwort (Moehringia [Arenaria] macrophylla), prince's-pine (Chimaphila umbellata), Hooker fairybells (Disporum hookeri), rattlesnake-plantain (Goodyear oblongifolia), whiteflower hawkweed (Hieracium albiflorum), slendertube iris (Iris chrysophylla), twinflower (Linnaea borealis), oneside wintergreen (Pyrola secunda), starflower solomonseal (Smilacina stellata), western starflower (Trientalis latifolia), evergreen violet (Viola sempervirens), Whipplevine (Whipplea modesta), and bear-grass (Xerophyllum tenax). Other species are trees, such as the bigleaf maple (Acer macrophyllum), madrone (Arbutus menziesii), and chinquapin (Chrysolepis chrysophylla); shrubs include: greenleaf manzanita (Arctostaphylos patula), the Oregon-grapes (Berberis aquifolium, B. nervosa), pinemat manzanita (Arctostaphylos prostratus), hairy honeysuckle (Lonicera hispidula), and poison-oak (Rhus diversiloba).

South of Keene Creek Ridge mixed conifer forests t[illegible] as occur as more isolated stands as opposed to the more contingauous stands located to the north. Stands south of Keene Creek Ridge are often surrounded by non-forest grassland and shrubland plant communities while stands to the north are fragmented by historic logging practices. These conifer stands are distinctive as biologically diverse islands and represent unique isolated communities that are the last forest stands in the Klamath physiographic region. Linkage with the Sierra Nevadas occurs further to the east through the eastern Cascades.

Several variants of mixed conifer stands found as islands are of note south of Keene Creek Ridge and Pilot Rock. Below Pilot Rock are stands of Douglas-fir with a large white fir and incense cedar component. Further south and lower in elevation are stands with more of a pine component. Near the California border are stands with both a large dominant ponderosa pine component and a healthy pine understory. Throughout this area are open pine (mixed conifer stands) that grade into woodland pine-oak communities. Many of the mixed conifer stands have extended marginally (ecotonal or transition zones) into non-forest communities in the absence of fire. Another mixed conifer variant occurs in Oregon Gulch (see Oregon Gulch RNA). All of the mixed conifer variants described are distinctive as biologically diverse islands and represent unique isolated plant communities that need further study.

Thompson and Drewien (1983) distinguished the following conifer forest range types:

Douglas-fir Forest

Overstory is dominated by Douglas-fir with California black oak and madrone. Ponderosa pine is present in minor amounts. Grasses consist mainly of western fescue (Festuca occidentalis), mountain brome (Bromus), and California fescue (Festuca californica). Site type is typically found on deep to moderately deep soils on north slopes (sometimes south slopes).

Douglas-fir / Mixed Pine

Douglas-fir dominates the overstory with sugar pine (Pinus lambertiana) and ponderosa pine present. Western fescue (Festuca occidentalis), Alaska onion-grass (Melica subulata), and California brome (Bromus carinatus) are chief understory species. Soils are moderately deep and high in iron, sometimes stony and gravelly throughout the profile. Sites occur on nearly flat to steep slopes, usually south-facing slopes.

Mixed Fir-Oceanspray

White fir is the dominant species, although Douglas-fir is found at high densities in this site type, pines are scarce. Oceanspray is the dominant mid-story species. Mountain brome (Bromus marginatus), western fescue (Festuca occidentalis), and Alaska onion-grass (Melica subulata) are predominant understory grasses. Most sites are on moderately steep, north slopes. Soils are deep with a loam surface horizon and clay loam subsurface.

White Fir Forest

White fir (Abies concolor) is the dominant species. Other conifers are scarce. Alaska onion-grass (Melica subulata), Ross sedge (Carex rossii), and mountain brome (Bromus marginatus) are significant grasses in the understory. Sites may be on flats or steep slopes. Soils are usually deep clay loams, although some sites are stoney throughout the profile.

Franklin and Dyrness (1973) describe the White Fir Zone as a narrow belt located at the upper margin of the Mixed Conifer Zone. In southwestern Oregon, this zone is not as clearly separated from adjacent vegetative zones as it is in other regions in the state. In the CSEEA, there is a gradual transition from the Mixed Conifer Zone to the White Fir Zone beginning at the 4,200 foot elevation. The White Fir Zone becomes clearly recognizable above 5,000 feet around Hyatt Lake and on Table, Chinquapin, Soda, Porcupine, and Hobart mountains. It occupies most of the higher elevation areas. The White Fir Zone differs from the Mixed Conifer Zone by having significant winter snow accumulations. Consequently, vegetation suffers less stress from lack of moisture. This zone is found within the Upper Jenny Creek, Middle Jenny, and Keene Creek subwatersheds. The landscape pattern of this zone is more fine grained than the previous vegetation zones; numerous clearcuts, meadows, and rock outcrops are present in the landscape.

The White Fir Zone is characterized by extensive stands of coniferous forest interspersed with wet meadows. White fir is the major tree species and may occur as pure or nearly pure stands. In areas where there is a mixture with other conifers, Douglas-fir is the most common associate. Sugar pine, ponderosa pine, and incense cedar may also be present. Ponderosa pine, Jeffrey and lodgepole pine have been used extensively in plantations as they are more tolerant of the severe frost conditions than some other species such as Douglas-fir. Lodgepole pine is also found as a pioneer species occurring naturally, particularly on the edges of frostprone meadows. It was likely more common during the little ice age of the 19th century.

Mixed Fir Forest

Similar to the Mixed Fir-Oceanspray site, dominance of understory by oceanspray is not evident. Understory is shared Rocky Mountain maple (Acer glabrum), deerbrush, serviceberry, and hazelnut (Corylus cornuta var. californica). Sites have deep clay loam soils on steep north-facing slopes.

Riparian Vegetation

As defined here, riparian vegetation grows where adequate water from nearby streams and small ponds or a high water table can support a characteristic terrestrial broadleaf deciduous plant community along their margins. These species cope with the long, dry summers of the analysis area by growing where there is adequate water to meet their transpirational needs throughout the dry period.

Typical trees include: Oregon white alder (Alnus rhombifolia), black cottonwood (Populus balsaminifera var. trichocarpa), Oregon ash (Fraxinus latifolia), and bigleaf maple (Acer macrophyllum).

Commonly encountered shrubs are mock-orange (Philadelphus lewisii), willow species (Salix spp.), Douglas spiraea (Spiraea douglasii), ninebark (Physocarpus capitatus), Indian-plum (Oemleria cerasiformis), and Douglas hawthorn (Crataegus douglasii).

The NRCS (1993) database identifies a loamy flood plain of ABIN soils. Associated plants include willow, himalaya blackberry, common snowberry, skunkbush sumac, Pacific serviceberry, Pacific poison oak, Klamath plum, black cottonwood, Oregon ash, Oregon white oak, Kentucky bluegrass, and wild grape.

Special Plant Communities

Included within special communities are plant groupings considered rare within the larger, regional landscape (Western Juniper-Oregon white oak, Rosaceous chapparal), groupings rare within the analysis area (Mountain Mahogany stands, old growth Sugar Pine stands), plant communities susceptible to undesired change (biscuit scablands), or, plant communities of great ecological significance within the analysis area (aquatic vegetation, and wet and semAppendix C – Plant Community Description

Biscuit Scabland

The wet lands associated with patterned ground and vernal pools support a diverse and biologically important flora. As vernal pools dry seasonally, they undergo a series of transformations with one set of species replacing another. These vernal pools are characterized by species. Howell quillwort (Isoetes howellii), least mouse-tail (Myosurus minimus), mountain navarretia (Navarretia intertexta), downingia (Downingia elegans), and various species of popcorn-flowers (Plagiobothrys spp.). The most significant species is Bellinger meadowfoam (Limnanthes floccosa var. bellingeriana), a Federal Species of Concern and ONHP Level 1 species is discussed further under Plant Species with Special Status section.

The characteristic biscuit scabland, or mound and swale topography is relatively rare on the landscape. In the analysis area these topographies are generally associated with grasslands with a predilection for annual grass invasion.

Western Juniper-Oregon white oak

Kagan and Caicco (1996) describe a western juniper-Oregon white oak woodland on south slopes and rolling hills found around Siskiyou Pass and Pilot Rock east along the California border often on deep clay, stony soils. A similar type is found in the Oregon Gulch RNA. Western juniper and Oregon white oak co-dominant with ponderosa pine along the margins or as isolated individuals within the stand. Wedgeleaf ceanothus is the dominant shrub, although Klamath plum (Prunus subcordata), Brewer oak (Quercus garryana var. breweri), and serviceberry (Amelanchier alnifolia) are important under the oak canopy. Idaho fescue (Festuca idahoensis), bluestem wheatgrass (Agropyron [Pseudoroegneria] spicata), California oatgrass (Danthonia californica), pine bluegrass (Poa secunda), and needlegrasses (Stipa [Achnatherum] spp.) are dominant native grasses. However, the habitat is usually dominated by introduced alien annual grasses, including Medusahead rye (Taeniatherium caput-medusae), dogtail (Cynosurus echinatus), and various Bromus species. Forbs include: wooly sunflower (Eriophyllum lanatum), Western hawksbeard (Crepis occidentalis), narrowleaf desert parsley (Lomatium triternatum), Oregon mariposa lily (Calochortus tolmei), Blepharipappus (Blepharipappus scaber), and woollyhead clover (Trifolium eriocephalum). At lower elevations, yellow starthistle (Centaurea solstitialis) can be a significant weed.

Rosaceous Chaparral Types

Brock and Callagan (1998a) have discovered that the eastern Siskiyou rosaceous chaparral for which the Scotch Creek RNA was established consists of three relatively distinct plant communities.

Garry Oak/Klamath Plum-Wedgeleaf Ceanothus

This community is a minor component of the Scotch Creek RNA, occurring on the lower and middle slopes of the west aspects of Lone Pine Ridge and extending south across the Oregon/California border. It is a typical dry-site chaparral but appears to be fairly localized in its occurrence. It differs significantly from similar communities in the Applegate Valley because poison oak is absent. This community may extend up the Klamath River Canyon to the east.

Garry oak is always present, usually in shrub form, at a cover which can vary widely depending on soil depth. Wedgeleaf ceanothus and Klamath Plum are both usually present with covers averaging 23 percent and 57 percent respectively. Klamath plum is clearly the more abundant species on most sites. Birchleaf mountain mahogany is common at the higher elevations with covers of up to 5 percent. Annual grasses (Bromus japonicus, B. tectorum and B. mollis) dominate the grass/forb layer with frequent Lomatium californicum, Claytonia perfoliata and Dichelostemma capitata.

The soils supporting this type are classified as McMullin-Rock Outcrop complex. This community typically has very gravelly surface soils. Elevation ranges from 3,000 to 4,000 feet. The aspect is south to southwest. Slope position is lower to mid.

Garry oak/Mountain Mahogany-Klamath Plum Chaparral Complex (Lone Pine Ridge)

The upper slopes of the west face of Lone Pine Ridge are covered with a dense chaparral consisting of a mix of white oak, birchleaf mountain mahogany, with a regular presence (but low cover) of Klamath plum. Some areas are dominated by white oak with reduced levels of mountain mahogany; other areas are dominated by mountain mahogany with white oak cover reduced; much of the area is a more or less equal mix of these two. Where mountain mahogany is the dominant (and white oak cover low), canopy gaps are frequent and the herb layer is significantly more dense as well as more diverse with several dry-site (grassland) species occurring in the canopy gaps. Most of the area is very dense and extremely difficult to walk through.

Throughout the area, the dominant herb-layer species are Claytonia (both perfoliata and parviflora), Galium aparine, and Nemophila parviflora. These species are the same as are found to be dominant in the White Oak Woodland type and in the chaparral on Slide Ridge. Three other species, however, are found in high frequently in this complex: Hydrophyllum occidentale (average 2 percent cover), Osmorhiza chilensis (1 percent) and Clarkia rhomboidea (average 2 percent cover). These elements are significantly different than the Slide Ridge chaparral complex.

This complex consists of roughly the following proportions:

40% "Mixed Type" with white oak averaging 60 percent cover and mountain mahogany averaging 50 percent cover with 3 percent chokecherry and 3 percent Klamath plum and with 4 percent tall snowberry. This type closely resembles some of the drier chaparral (Mt. mahogany dominant) found on Slide Ridge.
30% "Dry Type" with Mountain mahogany averaging 65 percent and white oak averaging 5 percent. Klamath plum is usually present a 1 to 2 percent cover. Chokecherry and snowberry are usually absent. This type has frequent small open spots with dry-site species such as Collomia grandiflora, Bromus sterilis, Lomatium californicum and Eriophyllum lanatum.
10% White Oak Woodland: see separate description for the type; it occurs here fairly randomly often in the form of a large (apparent) clone in the middle of one of the other types.
10% Grassy openings, with typical mid-slope annual-grassland species; star thistle was not seen in this part of the RNA.
10% Rock outcrops

There does not seem to be any apparent aspect affinities in this complex except that the "Dry" Type (Mt. Mahogany dominant) seems to prefer the more southerly aspects. For the most part, the types are apparently randomly mixed.

The soils supporting this type are mapped as Heppsie-Mcmullin complex. The elevations ranges between 4,200 and 5,100 feet. The aspects is mainly southwest with some due west and some due south.

Garry oak / Mountain Mahogany-Snowberry Chaparral Complex (Slide Ridge)

On the entire east slope of Slide Ridge (west of Scotch Creek) is a complex similarly dominated white oak and mountain mahogany but more moist than the Lone Pine Ridge complex. There is considerable variation in species composition across the slope and some patterns are discernable. However, there are no clear delineations, and all of the "types" more or less integrated. The vegetation is fairly uniformly short-statured (10-20 feet in height) and moderately dense. It can be traversed on foot with reasonable ease, though fairly slowly. The tree/shrub layer cover is consistently high, averaging 90 percent. White oak is always present with an average cover of 54 percent. Mountain mahogany is usually present with an average cover of 30 percent. Snowberry is usually present with an average cover of 18 percent. Serviceberry, tall Oregon grape, Klamath plum and chokecherry all have high frequency and average 2 - 9 percent cover. Mock orange (Philadelphus) and Indian plum (Oemleria) occasionally occur. Claytonia (perfoliata and parviflora) and Galium aparine dominate the herb layer with Smilacina racemosa usually present. Other high frequency species include Nemophila parviflora, Viola sheltonii and Clarkia rhomboidea. This complex differs from the Lone Pine Ridge chaparral complex in the consistent high cover of snowberry (average 18 percent), the consistent presence of Smilacina racemosa and Viola sheltonii and the significantly lower cover of Hydrophyllum, Clarkia rhomboidea and Osmorhiza chilensis. It also lacks the dry grassland species which are fairly frequent in the Lone Pine Ridge chaparral.

While it is difficult to distinguish distinct types in this complex, there are some patterns which can be described. The complex is roughly composed of the following mix of community types:

40% White Oak-Mt. Mahogany; White Oak Dominant: This type averages 60-70 percent white oak and 20 percent mountain mahogany with 20 percent snowberry; it is fairly moist and occurs on northeast, east, southeast aspects.

20% White Oak-Mt. Mahogany- Mt. Mahogany dominant: This type averages 30-35 percent white oak and 60 percent Mountain mahogany with snowberry much less abundant; it is fairly dry and usually occurs on southeast aspects. This type is closely related to the "mixed" type of the Lone Pine Ridge upper complex.

10% White Oak Woodland: see the separate description for this type. It occurs here on east and southeast aspects, typically on lower slope position..

5% Riparian: in each of the small draws which dissect the area there is a narrow band dominated by dense Philadelphus, with Holodiscus and occasional maple.

5% Rocky grassy openings: typically on southeast aspects, often with a strong native Idaho fescue component.

20% Sites with Douglas Fir-White Oak or Douglas Fir/Serviceberry-Oregon Grape conifer potential are mostly currently dominated by white oak (40-50 % cover), mountain mahogany (20-25 % cover) and snowberry (32 % cover) like the previous two types, but also have consistent serviceberry (20 % cover) at higher elevation. Also distinctive in this more moist type is the regular presence of chokecherry, baldhip rose, silktassle, Oemleria, Lonicera ciliosa and occasional thimbleberry. The herb layer also has some distinctive species such as Trientalis latifolia and Moehringia macrophylla which are both usually present with a 2 percent cover. Douglas fir, black oak and ponderosa pine are present in some of the areas. The potential for some of this area is for a open canopied Douglas-fir or ponderosa pine overstory with white oak or black oak in the understory and continued fairly dense shrub layers. Some areas are trending toward the Douglas-fir/Serviceberry-Oregon Grape (PSME/AMAL-BEPI) type. Other areas seem to be more trending toward keeping Garry oak as a co-dominant. It is probable that most of this area has not seen much more than scattered conifers for a long time due to repeated fires, but given enough time without disturbance, the conifer component would develop. This does not mean that the area "should" be pushed toward conifer dominance...it just means that the ecology of the area is more difficult to interpret than was formerly thought. These conifer-potential sites are on north and northeast aspects, often clearly delineated by ridgelines.

The soils in this area are mapped as Bogus very gravelly loam with large inclusions of Heppsie McMullin complex. Aspect includes north through southeast with northeast dominant. The elevation ranges from 3,000 feet to 4,100 feet.

Mountain Mahogany

The Curlleaf Mountain mahogany series by Sawyer and Keeler-Wolf (1995) is the only vegetation description that approximates the single stand of Mountain Mahogany occuring within the analysis area. However, the description includes many species not present within the analysis area.

Rock Outcrops

Rock outcrops are sparsely vegetated with the most frequent species being Juniperus occidentalis, Prunus subcordata, Bromus tectorum, Pseudoroegneria spicata, Alyssum alyssioides, Penstemon deustus and Lomatium californicum. At higher elevations, Sedum obtusatum is common. A large population of Woodsia oregana also occurs at the higher elevations. A large sprawling member of the Hydrophyllaceae, Phacelia ramosissima var. eremophila, interesting eastern Oregon species, was found in protected (shady) areas of rock outcrops. The distinctive Scotch Creek RNA rock outcrop plant community is frequently associated with grassland complexes and outcrops in tree and shrub dominated communities. Opuntia xx is associated with the Cathedral Cliffs area.

Franklin and Dyrness (1973) describe two xeric meadow communities that could be associated with rock outcrops: forest openings with exposed bedrock dominated by cryptogams; and rock-bound communities dominated by Sedum oregonense, Caespitose Polygonaceae, and Xeromorphic ferns.

Semi-Wet Meadows

Sites are located on flats under semi-wet conditions. Moderately deep, clay-loam soils are poorly drained. Site is dominated by California oatgrass (Danthonia californica) and meadow sedge (Carex praticola). Swamp buttercup (Ranunculus orthorhynchus) is usually the dominant forb on various elevations.

Meadows in the White Fir Zone frequently have islands of white fir in them. The white fir in these islands form compact, densely stocked units where crowns extend to the tree base on the outer meadow edge. The interiors of these tree groups are protected from wind exposure and moisture extremes. A moist, shady microclimate is maintained that is beneficial to tree and stand vigor and that is preferred habitat for many wildlife species.

Some openings in the white fir forest are maintained by late melting snow fields. These openings are important as the main habitat for Klamath lambs-tongue (Erythronium klamathense), an endemic species known mostly from the Southern Cascade and Klamath River Ridges Ecoregions. Yellow-bells (Frtilliaria pudica), also abundant in these openings, is an example of an east of the Cascade species that points to the importance of the analysis area from the standpoint of connectivity. Yellow-bells reaches its western most distribution in the Rogue River Valley.

The NRCS (1993) data identify poorly drained bottoms (rush, sedge, mannagrass, cattail, willow, timothy), wet loamy terraces (Douglas spirea, common snowberry, Ponderosa pine, Idaho fescue, Western fescue, Pacific serviceberry) , semi wet meadows (California danthonia, sedge, clover, timothy, redtop, Canada bluegrass, Kentucky bluegrass, slender wheatgrass), and wet meadows (tufted hairgrass, meadow barley, sedge) as plant communities mediated by wet edaphic conditions.

Aquatic Vegetation

Aquatic vegetation consists of those species that grow in or near still or flowing water and may be free-floating or attached and/or emergent. Free-floating species include various duckweeds and their relatives (Lemna, Spirodela, and Wolffia). These tiny plants float on the surface of ponds and in still water of flowing streams. Common attached floating vegetation consists of water-star wort (Callitriche sp.), waterweed (Elodea), various species of pondweed (Potamogeton), water smartweed (Polygonum amphibium), and Indian pond-lily (Nuphar polysepalum). Emergent species include: cattail (Typha latifolia), bulrush (Scirpus sp.), spike-rush (Eleocharis sp.), and bur reed (Sparganium sp.), and water plaintain (Alisma sp.). These species occur at different places in the proposed CSEEA (in streams, stockponds, and the Parsnip Lakes) depending on current water depth and substrate.

There are numerous open, wet areas in the analysis area that support a variety of characteristic forbs depending on soils, hydrology, and seasonality and duration of soil moisture in addition to the semi-wet meadows described Thompson and Drewien (1983). Some open areas with a continuous water supply for much of the growing season support extensive open areas dominated by California false-hellebore (Veratrum californicum), with nettle-leaf giant hyssop (Agastache urticifolia), parsley-leaf licorice-root, alpine timothy (Phleum alpinum), Columbia brome (Bromus vulgaris), showy onion-grass (Melica spectablis), lupines, paintbrushes, and owl-clover.

A summary of plant community classification systems pertinent to the CSEEA in Oregon are listed in Table AC-1. Only levels of organization relevent to the analysis area are included.

Table AC-1. Plant Community Classification Systems in proposed CSEEA

Classification System	Grasslands	Shrublands	Woodlands	Conifer
Franklin & Dyrness (1973) plant community descriptions; no spatial data	Sloped Grassland Level Grassland	Shrub Scrub	Oak Woodlands	Mixed Evergreen (*Pseudotsuga-Sclerophyll*) *Zone* Mixed Conifer (*Pinus-Pseudotsuga-Libocedrus [Calocedrus]-Abies*) *Zone* *Abies concolor Zone* *Abies magnifica shastensis Zone*
Atzet et al 1996 classification system for conifer communities based on potential natural vegetation; no spatial data	none	none	Oregon White Oak Series with 2 associations QUGA4-PSME/RHDI6 QUGA4/CYEC	Ponderosa Pine Series (2 associations) Douglas-fir Series (21 associations) White Fir Series (19 associations)
NRCS (SCS) classification system based on potential natural vegetation for each soil type; spatial data valid at coarse resolution only	13 classes reflecting soils, aspect, physiographic location, and vegetation. These classes reflect broad plant communities defined by the above column headings. Some classes reflect plant communities more explicitly, including Loamy Juniper Scabland and Loamy Shrub Scabland. Other classes identify habitats of particular interest (biscuit scabland, poorly drained bottom, semi-wet meadow, wet meadows)			12 plant communities, including Pine, Douglas Fir, and White Fir domination, as well Mixed Conifer
Sawyer & Keeler-Wolf (1995)	Bluebunch Wheatgrass Series California Annual Grass Series California Oatgrass Series Cheatgrass Series Idaho Fescue Series	Deerbrush Series Greenleaf Manzanita Series Holodiscus Series Wedgeleaf Ceanothus Series Whiteleaf manzanita Series	Curlleaf Mountain Mahogany series Oregon White oak Series Western Juniper series	Douglas Fir Series Incense Cedar Series Mixed Conifer Series White Alder Series White Fir Series

Table AC-1. Plant Community Classification Systems in proposed CSEEA

<table>
<tr><th>Classification System</th><th>Grasslands</th><th>Shrublands</th><th>Woodlands</th><th>Conifer</th></tr>
<tr><td>Kagan & Caicco (1996)
satellite derived spatial data - very course resolution</td><td>Modified Grassland
Grass-shrub
Sapling/regenerating Young Forest
Forest-grassland Mosaic</td><td>Mountain Mahogany Shrubland
Manzanita Dominant Shrubland</td><td>Oregon White Oak Forest
Western Juniper Woodland</td><td>Ponderosa Pine Dominant Mixed Conifer Forest
Douglas Fir/white Oak Forest
Ponderosa Pine Forest and Woodland
Douglas Fir Dominant-mixed Conifer Forest
Ponderosa Pine/white Oak Forest and Woodland
Ponderosa Pine-w. Juniper Woodland</td></tr>
<tr><td colspan="5">Fox et al (1997)
TM satellite derived spatial data with a total of xx classes; data only validated at the level of course plant communities (grassland, shrubland, woodland, conifer). Useful for looking at patterns of plant communities across the landscape, as well as conifer connectivity across California and southern portion of Oregon. Supervised classification using SVIM data is a possibility.</td></tr>
<tr><td>SVIM (Hickman 1971Thompson & Drewein 1983) detailed classification system wich spatial data for public lands. Mixture of present condition and potential plant communities</td><td>Steep Foothill Grassland
Steep Mountain Grassland
High Mountain Grassland
Dry Meadow
Semi-Wet Meadows</td><td>Shrubby Scabland

Several Shrub Plant Communities Are Assumed Within Woodland Plant Communities</td><td>Mahogany- Oak-Fescue
Oak-Pine-Fescue
Oak-Pine-Oatgrass
Pine-Oak-Fescue</td><td>Douglas-fir Fores:
Douglas-fir-Mixed Pine
Mixed-fir-Oceanspray
White-fir Forest
Mixed Fir Forest
Shasta Fir Forest</td></tr>
<tr><td>Riegel et al (1992) classification system only</td><td>none</td><td>none</td><td>QUGA/BRCA
QUGA/CYEC
QUGA-PSME/FEOC
QUGA-PSME/ELGL
QUGA-CEBE</td><td>none</td></tr>
</table>

Appendix D - Introduced Plant Species

Table AD -1. Introduced Plant Species

Scientific Name	Common Name	Scientific Name	Common Name
Agropyron intermedium	intermediate wheatgrass	*Holosteum umbellatum ssp. umbellatum*	jagged chickweed
Agrostis tenuis	colonial bentgrass	*Hordeum marinum*	Mediterranean barley
Aira caryophyllea	silver European hairgrass	*Hypericum perforatum*	klamathweed
Alyssum alyssoides	pale madwort	*Hypochaeris radicata*	false-dandelion
Anthemis cotula	mayweed	*Isatis tinctoria*	dyer's woad
Anthriscus caucalis	bur-chervil	*Lactuca serriola*	prickly lettuce
Arenaria serpyllifolia ssp. serpyllifolia	thymeleaf sandwort	*Lactuca saligna*	least lettuce
Arabidopsis thaliana	mouse-ear cress	*Lepidium campestre*	field pepperweed
Brassica nigra	field mustard	*Leucanthemum vulgare*	oxeye daisy
Bromus diandrus	ripgut grass	*Linaria dalmatica*	dalmatian toadflax
Bromus hordeaceus	soft brome	*Lolium perenne*	perennial rye
Bromus japonicus	Japanese brome	*Lolium multiflorum*	annual ryegrass
Bromus madritensis ssp. rubens	foxtail chess	*Lotus corniculatus*	bird's foot trefoil
Bromus secalinus	rye brome	*Lythrum salicaria*	purple loosestrife
Bromus sterilis	poverty brome	*Melilotus alba*	white sweet-clover
Bromus tectorum	cheat grass	*Mentha pulegium*	pennyroyal
Capsella bursa-pastoris	shepard's purse	*Phleum pratense*	timothy
Centaurea maculosa	spotted knapweed	*Plantago major*	common plantain
Centaurea pratensis	meadow knapweed	*Plantago lanceolata*	English plantain
Centaurea solstitialis	yellow star-thistle	*Poa palustris*	fowl bluegrass
Centaurea diffusa	diffuse knapweed	*Poa bulbosa*	bulbous bluegrass
Centaurium erythraea	European centaury	*Poa pratensis ssp. pratensis*	Kentucky bluegrass
Cerastium glomeratum	mouse-ear chickweed	*Prunella vulgaris var. vulgaris*	self-heal
Cerastium fontanum ssp. vulgare	big chickweed	*Ranunculus repens*	creeping buttercup
Chenopodium botrys	Jerusalem-oak goosefoot	*Rubus discolor*	Himalayan blackberry
Cichorium intybus	chicory	*Rumex acetosella*	sheep sorrel
Cirsium arvense	Canada thistle	*Rumex crispus*	curly dock
Cirsium vulgare	bull thistle	*Sonchus asper*	prickly sow-thistle
Convolvulus arvensis	field bindweed	*Stellaria media*	common chickweed
Conyza canadensis	horseweed	*Taeniatherum caputmedusae*	medusahead
Crepis capillaris	smooth hawksbeard	*Taraxacum officinale*	common dandelion
Cuscuta pentagona	dodder	*Torilis arvensis*	spreading hedgeparsley
Cynosurus echinatus	hedgehog dogtail	*Tragopogon dubius*	yellow salsify
Dactylis glomerata	orchard grass	*Tragopogon porrifolius*	blue salsify
Daucus carota	Queen Anne's lace	*Trifolium hirtum*	rose clover
Dianthus armeria	Deptford pink	*Trifolium pratense*	red clover
Dipsacus sylvestris	teasel	*Trifolium repens*	white clover
Elytrigia intermedia ssp. intermedia	intermediate wheatgrass	*Trifolium dubium*	shamrock
Erodium cicutarium	redstem stork's bill	*Verbascum blattaria*	moth mullein
Festuca arundinaceae	tall fescue	*Verbascum thapsus*	flannel mullein
Galium parisiense	wall bedstraw	*Veronica persica*Persian	speedwell
Geranium molle	dovefoot geranium	*Vulpia myuros var. hirsuta*	rattail fescue
Holcus lanatus	velvet-[illegible]		

Appendix E- How Fire Risk Rating Was Calculated

The following figure displays the fire occurrence and fire frequency within the CSEEA.

Table AE-1. Fire Occurrence and Associated Fire Frequency.

Size Class	Number of Fires	Annual Fire Frequency
0.25 acres	101	7.82
1 acres	24	1.86
<100 acres	3	0.23
100-400 acres	1	0.07

Fire history data (table AE-1) over the past 31 years show that 60 of the 129 fires which have occurred in the CSEEA were on Bureau of Land Management land. These fires had an average size of 0.9 acres and the average response time to these fires was three hours. Sixty-nine fires started on private land with an average size of 7.6 acres and an average response time of 1 hour. Initial attack was done primarily (96%) with hand crews and engines. Fifty-seven percent of the fires occurred under high to extreme fire danger ratings with an average size of 13.6 acres in extreme conditions and 1.8 acres in high conditions. The remaining fires which occurred during fire season averaged 0.15 acres. Refer to maps 44 through 48 for more specific information regarding attack type, fires by ownership, fire size, response time, and fires by danger type.

A fire risk rating was developed for the CSEEA. The following formula was used to arrive at the fire risk rating.

Risk Rating= $[(x/y)10]/z$
x= number of starts recorded for the area from the fire start data base.
y= period of time covered by the data base.
z= number of acres analyzed (displayed in thousands).

Low Risk = 0-0.49; this projects one fire every 20 or more years/thousand acres.
Moderate Risk = 0.5-0.99; this projects one fire every 11-20 years/thousand acres.
High Risk = greater than 0.99; this projects one fire every 0-10 years/thousand acres.

Risk Rating for the CSEEA = $[(129/31)10]43{,}820 = .0009$

Appendix F-
Fire Suppression Tactics

During suppression activities on all BLM lands within the Cascade/Siskiyou Ecological Emphasis Area the following guidelines would be followed:

- BLM resource advisors will be dispatched to all fires which occur on BLM lands. These resource advisors are utilized to ensure that suppression forces are aware of all sensitive areas.
- When feasible, existing roads or trails will be used as a starting point for burn-out or backfire operations designed to stop fire spread. Backfires will be designed to minimize fire effects on habitat. Natural barriers will be used whenever possible and fires will be allowed to burn to them.
- In the construction of fire lines, minimum width and depth will be used to stop the spread of fire. The use of dozers should be minimized and resource advisors will be consulted when appropriate. Live fuels will be cut or limbed only to the extent needed to stop fire spread. Rehabilitation of fire lines will be considered.
- The felling of snags and live trees will only occur when they pose a safety hazard or will cause a fire to spread across the fire line.
- The construction of helispots should be minimized. Past locations or natural openings should be used when possible. Helispots will not be constructed within riparian reserves, or areas of special concern.
- Retardant or foam will not be dropped on surface waters, riparian reserves, or on occupied spotted owl or eagle nests.
- Resource advisors will determine rehabilitation needs and standards in order to reduce the impacts associated with fire suppression efforts.

Table AF-1 displays fire suppression tactics which would be used in the designated special management areas within the CSEEA.

The following are fire suppression guidelines for the Soda Mountain Wilderness Study Area.

- Protection agencies will notify the BLM immediately when a fire is reported in, or has the potential to enter the WSA.
- A BLM resource advisor shall be dispatched to all fires within the WSA. This individual will assist in identifying threatened resource, cultural or social values within the WSA. They will act as a liaison between the protection agency and the BLM Medford District.
- Earth moving equipment shall not be used without prior approval of the Medford District Manager. This authority may not be delegated and there will be no exceptions.
- Fire lines will be located to take advantage of natural barriers such as rock outcrops, streams and changes in vegetation.
- Unburned material may be left inside the fire line. All such material will be felt/tested with bare hands to ensure no sparks or glowing embers remain. Limbs, logs or other material turned parallel to the slope to prevent rolling will be placed or scattered to resemble natural conditions.
- Water barring of fire lines will be done to prevent accelerated erosion.
- Limbing of trees adjacent to fire lines will be done only if needed for fire suppression and/or fire fighter safety.
- Burning snags or trees will only be felled when they pose a definite threat to the containment of the fire or the safety of fire fighters.
- Logs within the proposed fire line location will be rolled out of their beds. If rolling is not possible fire lines shall be constructed around these logs were possible.

Table AF-1. Suppression tactics for designated special management areas within the CSEEA.

Designation	Fire Suppression Tactics
Owl Core Areas	• Protect nest tree and adjacent trees from felling or any type of damage. • Minimize fire damage to owl core area.
Archaeological sites	• No use of tractors or hand line construction on sites
Jenny Creek ACEC	• Confine use of vehicles to existing roads. • No use of retardant adjacent to Jenny Creek or other wet areas. • Do not use Jenny Creek as a water source for fire suppression efforts. • No use of tractors within the boundary of the ACEC.
Scotch Creek RNA	• Confine use of vehicles to existing roads which are adjacent to the RNA. • No use of retardant adjacent to Scotch Creek or other wet areas. • Do not use Scotch Creek as a water source for fire suppression efforts. • No use of tractors within the RNA boundary.
Pilot Rock ACEC	• Confine use of vehicles to existing roads. • No use of tractors within the boundary of the ACEC. • No use of retardant adjacent to creeks or wet areas.
Mariposa Lily Preserve	• Confine use of vehicles to existing roads which are adjacent to the Preserve. • No use of tractors within the boundary of the Preserve. • No handline construction through areas where Mariposa Lily populations are located.
Oregon Gulch RNA	• Confine use of vehicles to existing roads adjacent to the RNA. • No use of tractors within the boundary of the RNA. • No use of retardant adjacent to creeks or wet areas.
Beene Cabin	• Minimize disturbance to recreation site • Dispatch project manager and environmental specialist immediately.
Pacific Crest Trail	• Minimize impacts due to suppression efforts to trail and the immediate area that is visible from the trail. • Allow fire to burn across trail and in surrounding area rather than to put in major tractor lines to suppress fire.
Soda Mountain Wilderness	• Refer to Fire suppression guidelines which follows this table

- Helispots should use natural openings where only minimal improvements are necessary. Helispots should be constructed outside the WSA when possible.
- With the exception of removing obstructions, trails and waterways should not be improved. If improvement is necessary they should be restored to pre-fire conditions if possible.
- Fire engines and other non-earth moving equipment used in suppression efforts should use existing roads which are adjacent to the WSA. When this is not feasible efforts shall be taken to minimize crossings of streams, springs or wet areas. Steep slopes should beavoided.
- Use of fire retardant may be used but their use adjacent to existing water sources should be avoided.

Appendix G- Soda Mountain WSA Fire Management Plan

BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT OFFICE
3040 Biddle Road
Medford, Oregon 97504

March 16, 1987

MEMORANDUM

TO: State Director, 944
FROM: District manager, Medford

SUBJECT: Fire Management Plan for Wilderness Study Areas

Attached is the Fire Management Plan for the Mountain Lakes and Soda Mountain Wilderness Study Areas. The Plan was prepared in response to Instruction Memorandum No. OR-87-143.

There are two major points about the plan that I would like to emphasize. First, the fire management policies and guidance stated in the plan meet or exceed the Bureau's Interim Management Plan for Wilderness Study Areas and the Field Guide for Management Actions in Wilderness Study Areas. Second, the Soda Mountain WSA, because of its established fire dependent ecosystem, presents an opportunity for us to establish an effective wilderness fire management program.

Both environmental groups and resource managers have realized that the total exclusion of fire may be more damaging to an ecosystem than periodic burning. In the years ahead, using this plan as a starting point, I hope we will more fully utilize fire as a wilderness management tool.

David A. Jones

Attachment
Fire Management Plan

SODA MOUNTAIN, MOUNTAIN LAKES
WILDERNESS STUDY AREAS
FIRE MANAGEMENT PLAN
1987

Prepared by:	Clay W. Moore, Fire Management Specialist	3/16/87
Reviewed by:	Dorothy Mason, Assistant Area Manager	3/17/87
	Fred Tomlins, Outdoor Recreation Planner	3/18/87
	L. Roger Van Buskirk, Fire Management Officer	3/17/87
Recommended by:	Lance Nimmo, Area Manager	3/17/87
	David A. Jones, District Manger	3/18/87
Approved by:	Charles W. Lusher, State Director	6/11/87

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INTRODUCTION

This plan will provide direction and guidance to Bureau of Land Management (BLM) managers, Oregon State Department of Forestry (OSDF), U.S. Forest Service (USFS), and California Division of Forestry (CDF) fire protection personnel. The plan is designed to be of a protective, interim nature until the Soda Mountain and Mountain Lakes wilderness study areas (WSA) are either designated as wilderness or withdrawn from further study.

MANAGEMENT OBJECTIVE

In accordance with the Interim Management Plan (IMP) for wilderness study areas, prepared in 1979 and revised in 1983, the BLM and responsible protection agencies will continue all presuppression, suppression and post-suppression fire activities in wilderness study areas, using caution to avoid unnecessary impairment of the areas suitability for preservation as wilderness.

LEGAL DESCRIPTIONS

Soda Mountain WSA: The boundary of the Soda Mountain WSA, encompassing 5,640 acres, is defined as beginning at the southwest corner of Section 34, T. 40 S., R. 3 E., thence east along a line for one-quarter mile, thence north along a line for one-half mile, thence east along a line for one-quarter mile, thence north along a line for one-half mile, thence east along a line to the northeast corner Section 34, T. 40 S., R. 3 E., thence in an approximate southeasterly direction along the Pacific Power and Light Co. 115 KV powerline to where it intersects the Lone Pine Ridge Road on the east line of Section 12, T. 41 S., R. 3 E., thence in a westerly and northerly direction along the Lone Pine Ridge Road to where it intersects the Pilot Rock Jeep Road in the southwest portion of Section 31, T. 40 S., R. 3 E., thence east along the Pilot Rock Jeep Road to the northwest corner of Section 32, T. 40 S., R. 3 E., thence south along a line for one-quarter mile, thence S 870E to the east line of Section 35, T. 40 S., R. 3 E., thence south along a line to the point of beginning.

Because of the very irregular shape of this WSA, and prior use of the Lone Pine Ridge and Pilot Rock Jeep Roads for fire protection purposes, these road shall be considered the WSA boundary for fire management purposes.

Mountain Lakes WSA: The boundary of the Mountain Lakes WSA, encompassing 334 acres of public land, is defined as beginning at the northwest corner of Section 31, T. 37 S., R. 7 E., thence along a line for one-half mile, thence south along a line for one mile, thence west along a line to the southwest section corner of Section 30, T. 37 S., R. 7 E., thence north along a line to the point of beginning.

GENERAL DESCRIPTION

Soda Mountain WSA: The study area lies on the steep, south-facing slopes of Soda Mountain. It is comprised of ridges and peaks ranging in elevation from 2,800 to 6,000 feet. There are three major drainages bisecting the WSA, Camp Creek, Dutch Oven Creek, and Salt Creek. Soils consist of Skookum very cobbly clay and Heppsie clay below 4,000 feet with the Skookum series being the most common. McNull gravelly loam, Woodseye stony loam and McMullin-Rock outcrop are generally found at the 3,000 to 4,200 foot elevations; the McNull series would be the most common soil type found at this elevation. Farva cobbly loam and Hobit loam soil types are found at the 4,200 to 6,000 feet elevation with the Farva series being the most common soil type. Vegetation in the WSA consists primarily of perennial and annual grasses, shrubs and forbs at the lower elevations (2,800 to 3,500 feet). Shrubs and scattered patches of timber dominate at the higher elevations. Tree species such as Ponderosa Pine (Pinus ponderosa), Douglas-fir (Pseudotsuga menziesii), and Incense Cedar (Libocedrus decurrens Torr), are mostly found on slopes which have a northerly to westerly aspect. A list of the dominant plant species found in the Soda Mountain WSA may be found in the appendix.

Mountain Lakes WSA: The Mountain Lakes WSA is east of, and adjacent to the Mountain Lakes Wilderness Area administered by the Dept. of Agriculture, U.S. Forest Service. The study area lies on the steep east slope of Aspen Butte and is isolated from most other BLM administered land. Elevation of the area ranges from 5,000 to 6,300 feet. Soils in the WSA have a parent material of fine grained andesitic basalt, and are classed as Woodcock stony loam on the lower third of the WSA, and Oatman cobbly loam at the higher elevations. Vegetation of the study area is classed as being in the mixed conifer zone. Primary forest species found are White Fir (Abies Concolor), Douglas-fir, Ponderosa Pine and Shasta Red Fir (Abies magnifica shastensis). White Fir, Douglas Fir and Ponderosa Pine occur at 5,200 to 5,600 feet elevation. White Fir and Shasta Red Fir are dominant at 5,600 to 6,200 feet. This forest type is characteristically broken by brush patches consisting of Golden Chinquapin (Castanopsis chrysophylla), and Greenleaf Manzenita (Arctostaphylos patula). Pinemat Kinnikinnick (Arctostaphylos uva-ursi) is the ground cover type most commonly found in the Shasta Red Fir and White Fir zones.

From field examination, standing timber volume is estimated to be approximately 7.5 million board feet. No threatened or endangered plant species have been found within the Mountain Lakes WSA.

THE NEED TO PREVENT IMPAIRING ACTIONS, AND EXISTING WILDERNESS CHARACTERISTICS

The need to prevent impairing actions: The 1976 Federal Land Policy and Management Act (FLPMA) directs the BLM to manage Wilderness Study Areas in a manner which preserves their suitability for wilderness preservation, except in cases where the safety of persons or personal property are immediately threatened. For fire management considerations Immediately threatened shall mean the fire may cause damage to life or property within the same burning period. The BLM must ensure that proposed or mandatory fire management actions shall not create a situation that would impair the wilderness suitability of the area.

Existing Wilderness Characteristics, Soda Mountain WSA: Steep terrain, dense brush fields, limited stands of commercial timber and difficult access hav all contributed to keeping this area in an essentially natural state. The three major drainages, Camp Creek, Dutch Oven Creek and Salt Creek, that bisect the area combined with dense vegetation provide topographic screening. The area provides outstanding opportunities for observing birds and other animals. Water is abundant and scenic vistas are numerous. The Pacific Crest National Scenic Trail borders the northwest portion of the study area. The south slopes are deer winter range with the southeastern portion designated as critical deer winter range. Wilderness-associated game species found in the area include black bear, mountain lion, bobcat and golden eagles. There is great ecological diversity in the area and it is suspected that Calochorus greenei and Cirsium ciliolatum, which are both candidates for the threatened or endangered federal lists, may be found in the WSA. (If observed, these plant species are to receive the same protection as federally listed threatened or endangered species).

Existing Wilderness Characteristics, Mountain Lakes WSA: There is a direct relationship between this WSA and the existing Mountain Lakes Wilderness Area. The fact that the two are adjacent is the reason this area is being studied. if designated as wilderness at the completion of the study, the area would help maintain the integrity of the Mountain Lakes Wilderness Area. When considered as an addition to the existing wilderness area, the Mountain Lakes WSA offers outstanding opportunities for solitude and primitive recreation in generally natural conditions. From an ecological view there are no unique features in the area. The primary uses of the area are currently wildlife habitat, watershed protection, hunting and back-country hiking. The steep slopes and limited access, has helped maintain the natural appearance of this area.

NATURAL ROLE OF FIRE AND FIRE CHARACTERISTICS

Soda Mountain WSA: Plant communities in this area are dynamic. In the past, fire has been a major natural component that ensured change. Though a detailed fire history study of the Soda Mountain WSA has not been undertaken, sufficient data has been collected so the role of fire and fire characteristics of the area can be discussed in generalized terms. Plant communities found in the area are classed as the Sclerophyllous hardwood type. Dominant genera include Arctostaphylos, Ceanothus and Quercus. These plants are characterized by extensive root systems, dense rigid branching and small leaves. Sprouting after fire is the most common reproduction strategy employed by the Sclerophyllous hardwood species. Most plants in the community have resistant seeds that retain their viability for decades and in some cases require fire or extreme heat before they can germinate. Because of this, fire serves as the major cause of succession by creating the conditions necessary for establishment and perpetuation of most species found. Different intervals between fires can shift species composition or with the total exclusion of fire, some species may disappear from the area entirely. Long intervals between fires may allow the Sclerophyllous hardwoods to mature and after 30 to 50 years, plants may contain 25 to 50 percent dead woody material. This is the stage vegetation is currently at in the Soda Mountain WSA. Thus, when a fire does start, it could be extremely intense and fast moving.

The effect of fire on the soils in the study area is dependent on fuel accumulations (duff and litter layers), soil moisture conditions and fire intensity. Soil erosion is usually accelerated following a fire in this area. Depending on the intensity and resident time of the fire on a given area, water repellent layers could be formed. Nutrients will be temporarily increased, but because of the generally high intensities encountered in this fuel type, nitrogen and potassium may be volatilized; here again, it would be dependent on the resident time of the fire on a given area. The chance of having sustained fire intensities for a period of time sufficient to damage the soil types identified in the WSA is minimal for the majority of the area.

Mountain Lakes WSA: The exact role of fire, and fire characteristics of the vegetation in this area is not known. This is true of all the mixed conifer zones found in south central and southwestern Oregon. Frequency of fire occurrence is low at the higher elevations and moderate to high at the lower elevations in the Ponderosa Pine zone. In the gradient from Ponderosa Pine to White Fir to Shasta Red Fir, species display a range of shade and fire tolerance. Pine needles form flammable fuel beds which are conducive to burning. The White Fir type has a compact fuel bed that burns less often. It is known that fire can and does create small openings where moisture becomes available after the death of one or more of the mature trees and if the opening is not too large, trees can compete with the Sclerophyllous hardwoods. The exact role of fire in the reproductive strategies of these forest species is now known, but it is not considered critical to perpetuation of these forest species. Brush fields may develop on burned areas depending on size of opening created and significantly slow the rate of forest succession. Repeated burning of these brush fields may make them semi-permanent communities. It is suspected by researchers that the most dramatic role of fire in this vegetative type is the maintenance of fire tolerant species over shade tolerant species.

Fires in this forest type do not result in universal burning over the entire soil surface; therefore, soil erosion seldom occurs. Nutrient levels will be temporarily increased after burning, and since fires are of generally low intensity, volatilization of nitrogen and potassium should not occur. Formation of water-repellent layers is also not critical in this area.

FIRE MANAGEMENT POLICY AND GUIDANCE

Past fire occurrence

According to Oregon State Forestry records, approximately fifteen fires occurred in the vicinity of the Soda Mountain WSA between the years 1976 to 1984. These fires were between one-quarter to five acres in size with an occurrence of one fire in 1976 to five fires in 1984.

Because of the small size of the Mountain Lakes WSA, records showing past fire occurrence in this area are not available. It is suspected that when fires did occur they were of a low intensity and one-quarter acre or less in size.

Prescribed Fire

Prescribed natural fire, resulting from unplanned ignitions, will not be allowed to occur in the WSA's at this time. Provisions for allowing prescribed natural fire in the Soda Mountain WSA may be incorporated into this fire management plan when the fire environment and fire regime that currently exist can be identified, and fire management areas established. The possible future use of prescribed natural fire shall pertain only to the Soda Mountain WSA.

Prescribed fire, resulting from planned ignitions, shall be permitted in the Soda Mountain WSA to maintain the natural condition of a fire dependent ecosystem. Use of prescribed fire, utilizing planned ignitions in the WSA, will require development and circulation of an Environmental Analysis. The U.S. Forest Service policy of not allowing planned ignitions in wilderness areas shall apply to the Mountain Lakes WSA.

Smoke Management

The Soda Mountain WSA is approximately seven miles southeast of the boundary of the Medford / Ashland non-attainment area. The Mountain Lakes WSA is approximately 40 miles south of Crater Lake National Park and 13 miles northwest of Klamath Falls, Oregon. Since prescribed fire resulting from planned or unplanned ignitions are not permitted in the Mountain lakes WSA, smoke intrusions in either Klamath Falls or Crater Lake National Park, will be the result of wildfire and considered unavoidable. Prescribed burning resulting from planned ignitions in the Soda Mountain WSA will be done in accordance with the Oregon Smoke Management Plan.

Pre-suppression and Suppression Guidance

Protection agencies will notify the Bureau of Land Management, Medford District Office, immediately when a fire is reported in, or has the potential to enter either the Mountain Lakes or Soda Mountain WSAS. Telephone numbers and names of individuals that may be contacted are listed in the appendix.

When a fire report is received, a BLM Resource Advisor shall be assigned to the fire and will contact the responsible protection agency as soon as possible. A list of qualified resource advisors and their telephone numbers is in the appendix. It will be the function of the Resource Advisor to:

1. Obtain the legal description of the fire, existing and expected fire behavior and current fire weather information.

2. Assist protection agency officials in identifying threatened resource, cultural or social values.

3. Act as a liaison between the protection agency and the BLM Medford District for specific fire management actions where District or Area manager approval is required.

4. Complete a Fire Behavior Report and Suppression Response Evaluation form which is attached to this plan (see appendix). These reports shall be completed as needed so an accurate record of fire activities may be kept. The reports will be given or sent to the Medford District Fire Management Officer in a timely manner to ensure BLM management officials are kept current of the on going fire situation. If the Resource Advisor is unable to bring the completed reports into the District Office, he/she will call the reports in by radio or telephone.

A suppression response used in a WSA shall be mutually agreed upon between the BLM Resource Advisor and the responsible protection agency official. This may be done in advance of fire season, by the BLM requesting a copy of each protection agencies dispatch cards for the WSA'S. Suppression tactics and methods will be based on safety considerations, existing and predicted fire behavior and existing and predicted fire weather conditions. Decisions made should be based on more than economics since political and social values are valid when deciding the appropriate suppression response in a wilderness study area.

If the initial suppression response dictated by the dispatch card and burning index is modified by the BLM so as not to impair wilderness suitability and/or values, and this results in a cost that would not normally be incurred by the protection agency, the BLM will pay the additional cost.

A BLM Resource Advisor shall be required to be on-site at the fire if:

1. BLM management officials feel it would be beneficial to have a resource adviser on site.

2. The fire exceeds, or is expected to exceed, the initial attack response.

3. The fire is not expected to be contained in the same burning period.

When a resource advisor is dispatched to the fire, he/she shall work directly with the assigned incident commander. The resource advisor may request a reconnaissance flight to appraise the fire situation. An official from the protection agency may accompany the resource advisor on this flight. Determination of whether a flight is required shall be made by BLM officials. Their decision shall be based on current fire behavior and fire weather conditions. The flight will be made in accordance with BLM regulations and at BLM's expense. A special use flight plan has been prepared, approved and is attached to this plan.

Specific Policies and Guidance for Suppression and Post-Suppression Activities

The following suppression activities will not impair wilderness values if carried out as specified, and reclamation satisfies IMP criteria as approved by the area manager in whose jurisdiction the fire occurred.

EARTH-MOVING EQUIPMENT SHALL NOT BE USED WITHOUT PRIOR APPROVAL OF THE BLM's MEDFORD DISTRICT MANAGER. THIS AUTHORITY MAY NOT BE DELEGATED AND THERE WILL BE NO EXCEPTIONS.

-- Firelines will be located to take advantage of natural barriers, such as rock outcroppings, streams and changes in vegetative types.

-- Firelines scraped to mineral soil shall be covered with the material removed from them and shall be no wider than minimum necessary to stop the spread of the fire.

-- Unburned material may be left inside the fireline. All such material will be felt/tested with bare hands to ensure no sparks, or glowing embers remain. Limbs, logs and other material turned parallel to the slope to prevent rolling and spotting will be placed or scattered to resemble a natural condition.

-- Waterbarring of firelines will be done if needed to prevent accelerated erosion.

-- Limbing of trees along the fireline shall be done only if necessary for fire suppression and/or fire fighter safety.

-- Burning snags or trees shall be felled only when they are a definite threat to fire containment or the safety of fire fighters. As a guide, snags inside the established fire control line a distance equal or exceeding their height may need not be cut.

-- Logs within the proposed fireline will be rolled out of their beds. If rolling is not possible, let the log burn if a fireline can reasonably be constructed around it.

-- Helicopters should land in natural openings where only minimal improvements are necessary. Heliports should be constructed outside WSA's if possible.

-- Except for spot maintenance to remove obstructions, ways, trails or water sources should not be improved. If improved, they should be restored to their pre-fire condition if possible.

-- Fire engines, tankers and other non-earth moving equipment should be used on existing ways to the extent feasible. Such equipment may be used cross country where necessary, but such use will be held to the absolute minimum. Crossing of streams, springs and seeps should be avoided.

-- Use of fire retardants approved by the Dept. Agriculture, U.S. Forest Service may be used.

REHABILITATION GUIDELINES

Soil conservation and protection is the criterion to be used for rehabilitation decisions. Undesirable fire effects such as the return of poor forage or reduction of wildlife browse are not issues that would require emergency rehabilitation actions. It shall be assumed off-site values will be protected if soils are protected.

If seeding is proven to be necessary to protect soils, use of seed drills or planting of non-native species shall not be done without approval of the BLM's Oregon/Washington State Director. All
proposals for rehabilitation projects shall have an Environmental Analysis prepared and distributed at the same time justification for emergency funding is sent to the BLM State Office for review.

SUMMARY

As stated in the introduction, this plan is designed to be of a protective, interim nature. The Mountain Lakes WSA, if designated as wilderness, may be incorporated into the existing Mountain Lakes Wilderness Area. Further fire management recommendations for the Mountain Lakes WSA shall not be made as this plan is supplemented and updated. It should be emphasized that the Dept. of Interior's IMP and Field Guide for

Management Actions in WSA's shall apply until the area is designated as wilderness or withdrawn from further consideration.

The Soda Mountain WSA presents a greater challenge. Since the ecosystem of this area has evolved with fire, this plan should be supplemented to ensure fire remains a natural process within the area. Past fire protection programs have modified the ecosystem of the area and increased the potential of a catastrophic fire occurring. To correct this, it will be necessary when making future management recommendations to incorporate prescribed fire, both natural and planned into this fire management plan. Doing so will produce and maintain a dynamic ecosystem that will enhance the wilderness characteristics of the area as well as improving the habitat for wildlife that uses the area.

Appendix H - RMP Transportation Management Objectives

Table: AH-1. Transportation System Roads (T.39S., R.2E.)	Approx. miles	Access Status	Right of Way
39-2E-34 Segment F1 & F2 (Rocked Surface)	2.13	OPEN	
39-2E-34 Segment B, C, D, & E (Rocked Surface)	6.60		OR45999

Transportation System Roads (T.39S., R.3E.)	Approx. miles	Access Status	Right of Way
39-3E-11.0 C1 (Rocked Surface)	0.25	OPEN	
39-3E-13.0 (Natural Surface)	0.25		
39-3E-13.1 (Natural Surface)	0.25		
39-3E-13.2 A & B (Natural Surface)	0.75		
39-3E-13.4 (Natural Surface)	0.25		
39-3E-13.5 (Natural Surface)	0.10		
39-3E-13.6 (Natural Surface)	0.25		
39-3E-14.0 (Natural Surface)	0.50		
39-3E-14.1 (Natural Surface)	0.25		
39-3E-15.0 A & B (Natural Surface)	0.75		
39-3E-15.1 (Natural Surface)	0.20		
39-3E-23.0 (Natural Surface)	0.50		
39-3E-25.1 (Rocked Surface)	0.25		
39-3E-25.2 (Natural Surface)	0.25		
39-3E-25.3 (Rocked Surface)	0.25		
39-3E-26.1 (Rocked Surface)	1.00		
39-3E-26.2 (Rocked Surface)	1.00		
39-3E-27.0 (Rocked Surface)	2.25		
39-3E-27.3 (Natural Surface)	0.25		
39-3E-27.5 (Rocked Surface)	0.15		
39-3E-27.6 (Natural Surface)	0.25		
39-3E-32.3 C, D, E, F, G, H, I, L, & N (Rocked Surface)	5.25		
39-3E-34.0 (Rocked Surface)	0.40		OR50516 OR41384 OR18550 OR23467 ORE05569
39-3E-34.4 (Natural Surface)	0.75		
39-3E-34.6 A, B, & D(Rocked Surface)	1.20		
39-3E-35.0 A2, B, & C (Rocked Surface)	3.70		
39-3E-35.0 A1 (Rocked Surface)	0.55		OR50516
39-3E-35.2 C, D, E, & F (Rocked Surface)	3.00		
39-3E-35.2 A1 & B (Rocked Surface)	2.45		OR50516
39-3E-35.3 (Rocked Surface)	0.50		
Jeep Road S1/2S1/2 sec. 23 (Natural Surface)	0.60		OR13745
Access drive SW1/4 sec. 34 (Natural Surface)	0.01		OR41384
39-3E-13.3 (Rocked Surface)	0.10	RESTRICTED (i.e. may be gated)	
39-3E-14.0 (Natural Surface)	0.40		
39-3E-32.3 J, K, & M (Rocked Surface)	1.75		
39-3E-35.2 A2 & C (Rocked Surface)	1.00		
39-3E-23.1 (Natural Surface)	0.40	TEMP (i.e. gated)	
39-3E-26.0 (Rocked Surface)	0.40		
39-3E-27.2 (Natural Surface)	0.75		
39-3E-35.1 A & B (Rocked Surface)	1.05		
39-3E-27.1 (Natural Surface)	0.75	PERM (i.e. barricade)	

Table AH-1. Transportation System Roads (T.39S., R.4E.)	**Approx. miles**	**Access Status**	**Right of Way**
39-4E-5.1 B1 & B2 (Rocked Surface)	1.50	OPEN	
39-4E-6.0 (Rocked Surface)	1.25		
39-4E-7.1 (Natural Surface)	0.25		
39-4E-7.2 (Rocked Surface)	0.50		
39-4E-7.5 (Rocked Surface)	1.25		
39-4E-9.0 (Natural Surface)	1.00		
39-4E-9.1 (Natural Surface)	0.10		
39-4E-9.2 A & C (Rocked Surface)	1.50		
39-4E-9.3 (Rocked Surface)	0.75		
39-4E-9.4 (Natural Surface)	0.50		
39-4E-9.5 (Natural Surface)	0.10		
39-4E-10.0 D, H, & I (Rocked Surface)	1.50		
39-4E-15.0 A & C (Rocked Surface)	0.60		
39-4E-15.1 (Natural Surface)	0.40		
39-4E-15.3 (Natural Surface)	0.35		
39-4E-15.4 (Natural Surface)	0.20		
39-4E-15.5 ,Natural Surface)	0.10		
39-4E-16.1 (Natural Surface)	0.10		
39-4E-17.0 A1, D, & E (Rocked Surface)	2.75		
39-4E-17.1 A, B, & C (Rocked Surface)	1.25		
39-4E-17.2 (Natural Surface)	0.25		
39-4E-17.3 (Natural Surface)	0.75		
39-4E-17.4 (Natural Surface)	0.25		
39-4E-17.5 (Natural Surface)	0.35		
39-4E-17.6 (Natural Surface)	0.35		
39-4E-17.7 (Natural Surface)	0.50		
39-4E-18.1 B (Rocked Surface)	1.00		
39-4E-19.1 (Rocked Surface)	1.00		
39-4E-19.2 (Rocked Surface)	0.25		
39-4E-19.3 A & C (Rocked Surface)	0.50		
39-4E-19.4 (Natural Surface)	0.10		
39-4E-21.0 (Natural Surface)	0.50		
39-4E-21.1 (Natural Surface)	0.60		
39-4E-21.2 (Natural Surface)	0.40		
39-4E-22.1 (Rocked Surface)	0.25		
39-4E-23.0 A1 & A2 (Rocked Surface)	0.50		
39-4E-23.1 A & B (Rocked Surface)	0.50		
39-4E-23.2 B (Rocked Surface)	0.10		
39-4E-23.3 A1 & C (Natural Surface)	0.50		
39-4E-23.7 (Natural Surface)	0.10		
39-4E-27.0 B, D, & E (Rocked Surface)	0.35		
39-4E-31.2 A (Natural Surface)	0.20		
39-4E-6.0 C & D (Rocked Surface)	0.75	RESTRIC. (-2) (i.e. may be gated)	
39-4E-10.0 C, E, F, & G (Rocked Surface)	1.00		
39-4E-15.0 B (Rocked Surface)	0.15		
39-4E-16.1 (Natural Surface)	0.05		
39-4E-17.0 A2, B, & C (Rocked Surface)	0.6		
39-4E-18.1 A1, A2, & A3 (Rocked Surface)	1.25		
39-4E-19.3 B (Rocked Surface)	0.25		
39-4E-19.4 (Natural Surface)	0.25		
39-4E-22.0 (Rocked Surface)	0.50		
39-4E-23.2 A (Natural Surface)	.75		
39-4E-23.3 A1, A2, & B (Rocked Surface)	1.25		
39-4E-31.0 A (Natural Surface)	0.20		
39-4E-31.1 A (Natural Surface)	0.15		
39-4E-31.2 B (Natural Surface)	0.75		

Table AH-1. Transportation System Roads (T.39S, R.4E.)	**Approx. miles**	**Access Status**	**Right of Way**
39-4E-7.3 (Rocked Surface)	0.50	TEMP (i.e. gated)	
39-4E-7.4 (Natural Surface)	0.10		
39-4E-7.8 (Natural Surface)	0.20		
39-4E-8.0 B1, B2, & E (Natural Surface)	0.60		
39-4E-8.3 (Rocked Surface)	0.50		
39-4E-9.6 (Natural Surface)	0.50		
39-4E-23.6 (Natural Surface)	0.50		
39-4E-7.6 (Natural Surface)	0.50	PERM (i.e. barricade)	
[illegible]-7.7 (Natural Surface)	0.10		
39-4E-[illegible].2 (Natural Surface)	0.25		
39-4E-23.5 (Natural Surface)	0.40		
39-4E-23.8 (Natural Surface)	0.30		
39-4E-31.0 B (Natural Surface)	0.25		
39-4E-31.1 B (Natural Surface)	0.25		
Transportation System Roads (T.40S, R.2E.)	**Approx. miles**	**Access Status**	**Right of Way**
40-2E-1.0 (Natural Surface)	0.20	OPEN	
40-2E-11.0 (Natural Surface)	0.65		OR45305
40-2E-11.1 (Natural Surface)	1.50		
40-2E-11.2 (Natural Surface)	0.75		
40-2E-19.0 (Natural Surface)	0.50		
40-2E-24.0 (Natural Surface)	0.25		
40-2E-25.1 (Natural Surface)	0.10		
40-2E-25.2 (Natural Surface)	0.75		
40-2E-25.3 (Natural Surface)	0.50		
40-2E-25.4 Segment A & C (Rocked Surface)	0.50		
40-2E-33.0 Segment A, C, D, & F (Rocked Surface)	3.00		
40-2E-35.0 Segment A & B (Rocked Surface)	0.75		
40-2E-35.1 (Natural Surface)	0.25		
40-2E-25.4 Segment D & B (Natural Surface)	0.25	RESTRICTED (i.e. may be gated)	
40-2E-33.0 Segment E (Rocked Surface)	0.10		
Jeep Rd. starts in SE1/4NE1/4 and ends in NW1/4NE1/4 sec 14 (Natural Surface)	0.50		
Jeep Rd. in W1/2NW1/4 sec 14 (Natural Surface)			
Rd. in W1/2SW1/4 sec 20 (Natural Surface)	0.50		
Jeep Rd. in S1/2N1/2 sec 35 (Natural Surface)	0.10		
Jeep Rd. in S1/2N1/2 sec 36 (Natural Surface)	1.00		
	1.25		
40-2E-1.0 Segment B (Rocked Surface)	0.50	TEMP (i.e. gated)	OR49214 OR5439
40-2E-25.4 Segment E (Rocked Surface)	0.50		
40-2E-33.0 Segment G (Natural Surface)	2.00		
40-2E-35.2 (Rocked Surface)	0.35		
40-2E-35.3 (Rocked Surface)	0.25		
40-2E-23.0 (Natural Surface)	1.25	PERM (i.e. barricade)	
40-2E-23.1 (Natural Surface)	0.10		
40-2E-25.0 (Natural Surface)	0.50		
40-2E-35.4 (Natural Surface)	0.50	PERM (i.e. barricade)	
40-2E-35.5 (Natural Surface)	0.05		
Jeep Rd. in SE1/4NW1/4 sec 11 (Natural Surface)	0.25	CLOSED	
Jeep Rd. starts in NE1/4SE1/4 and ends in SE1/4SW1/4 sec 19 (Natural Surface)	1.00		
Jeep Rd. in SE1/4SE1/4 sec 35 (Natural Surface)	0.10		
Jeep Rd. in NW1/4SW1/4 sec 35 (Natural Surface)	0.05		
Jeep Rd. in SE1/4NE1/4 sec 35 (Natural Surface)	0.05		

Transportation System Roads (T.40S., R.2E.)	Approx. miles	Access Status	Right of Way
40-2E-1.0 Segment A & C (Rocked Surface) Rd. in SW1/4 SE1/4 sec 19 (Natural Surface) Jeep Rd. starts at end of 40-2E-1 and ends in SE1/4SE1/4 sec 24 (Natural Surface) Rd. in NW1/4 sec 30 (Natural Surface)	1.75 0.05 1.00 0.50	OPEN or CLOSED	

Transportation System Roads (T.40S., R.3E.)	Approx. miles	Access Status	Right of Way
40-3E-2.0 Segment A1 (Natural Surface)	0.05	OPEN	OR45305
40-3E-2.0 Segment A2, B, D, & E (Natural Surface)	2.25		
40-3E-3.0 Segment A, E, F, & G (Paved Surface)	2.75		
40-3E-3.0 Segment B1, B2, & C (Paved Surface)	2.00		OR50516 OR41764 OR10550 OR23467 ORE05569
40-3E-3.1 Segment B (Rocked Surface)	0.60		OR50516 OR41764 OR10550 OR23467 ORE05569
40-3E-3.1 Segment C1, & C2 (Rocked Surface)	1.25		
40-3E-5.0 Segment B, C, D, F, G1, G2, & H (Rocked Surface)	6.00		
40-3E-7.2 Segment (Rocked Surface)	0.15		
40-3E-7.3 (Natural Surface)	0.40		
40-3E-9.0 (Rocked Surface)	0.10		
40-3E-11.1 (Natural Surface)	0.50		
40-3E-12.0 Segment A1, A2, & B (Rocked Surface)	2.00		
40-3E-12.1 Segment A, B, C, D, E, & G (Rocked Surface)	3.5		
40-3E-12.2 Segment B (Natural Surface)	0.15		
40-3E-12.3 Segments B & D (Natural Surface)	0.35		
40-3E-13.0 (Natural Surface)	0.10		
40-3E-13.1 (Natural Surface)	0.15		
40-3E-14.1 (Rocked Surface)	1.00		
40-3E-15.0 Segments A&B (Rocked Surface)	1.00		
40-3E-15.1 (Rocked Surface)	1.50		
40-3E-15.2 (Rocked Surface)	0.10		
40-3E-15.3 (Rocked Surface)	0.75		
40-3E-15.4 (Rocked Surface)	0.25		
40-3E-16.0 (Natural Surface)	0.60		
40-3E-17.0 (Natural Surface)	0.40		
40-3E-18.0 (Natural Surface)	0.40		
40-3E-19.3 (Natural Surface)	0.25		
40-3E-21.0 (Natural Surface)	0.40		
40-3E-23.0 (Natural Surface)	0.40		
40-3E-23.1 (Natural Surface)	0.60		
40-3E-23.2 (Natural Surface)	0.25		
40-3E-23.3 (Natural Surface)	0.50		
40-3E-27.0 Segments A&C (Natural Surface)	0.75		
40-3E-27.1 (Natural Surface)	3.25		
40-3E-27.2 Segments A&B (Natural Surface)	3.50		
40-3E-29.0 (Rocked Surface)	0.75		
40-3E-31.0 Segment A (Natural Surface)	0.40		
40-3E-34.0 (Natural Surface)	0.50		

Transportation System Roads (T.40S, R.3E.)	Approx. miles	Access Status	Right of Way
40-3E-2.0 Segments C1, C2, & D1 (Natural Surface)	0.60	RESTRICTED (i.e. may be gated)	
40-3E-5.0 Segment E (Rocked Surface)	0.50		
40-3E-12.0 Segments B, C, & D (Rocked Surface)	1.00		
40-3E-12.1 Segments F&H (Rocked Surface)	0.60		
40-3E-12.2 Segments A&C (Natural Surface)	1.00		
40-3E-14.1 (Rocked Surface)	0.50		
40-3E-20.0 (Natural Surface)	0.10		
40-3E-27.0 Segment B (Natural Surface)	0.05		
40-3E-28.0 Segment A (Rocked Surface)	0.25		
40-3E-34.0 (Natural Surface)	0.25		
Jeep Rd. in sec 22 (Natural Surface)	2.00		
Jeep Rd. in NE1/4 sec 29 (Natural Surface)	0.50		
40-3E-17.1 (Natural Surface)	0.25	TEMP (i.e. gated)	
40-3E-19.0 (Rocked Surface)	1.50		
40-3E-19.1 (Rocked Surface)	1.25		
40-3E-19.2 (Natural Surface)	0.25		
40-3E-19.5 (Natural Surface)	0.25		
40-3E-23.5 (Natural Surface)	0.20		
40-3E-24.0 Segment B (Rocked Surface)	1.00		
40-3E-24.2 (Rocked Surface)	0.75		
40-3E-24.3 (Natural Surface)	0.40		
40-3E-24.4 (Rocked Surface)	1.00		
40-3E-25.9 (Natural Surface)	0.25		
40-3E-27.1 (Natural Surface)	0.10		
40-3E-29.0 (Natural Surface)	0.50		
40-3E-29.1 (Natural Surface)	0.75		
40-3E-7.0 (Natural Surface)	0.60	PERM (i.e. barricade)	
40-3E-7.1 (Natural Surface)	0.50		
40-3E-23.4 (Natural Surface)	0.20		
40-3E-24.0 Segment A (Natural Surface)	1.00	PERM (i.e. barricade)	
Two Jeep Rd. in NW1/4 sec 1 (Natural Surface)	1.00	OPEN or CLOSED	[illegible]
Jeep Rd. starts in NE1/4NE1/4 T.40S., R.3E., sec 13 and ends in NW1/4NW1/4 T.40S., R.4E., sec19 (Natural Surface)	1.50		
Jeep Rd. in SW1/4 sec 19 (Natural Surface)	0.25		
Jeep Rd. starts in NW1/4NW1/4 and ends in NE1/4NW1/4 sec 21(Natural Surface)	0.75		
Jeep Rd. in NE1/4 sec 21 (Natural Surface)	0.40		
Jeep Rd. starts in SW1/4NW1/4 sec 23 and ends in NE1/4NE1/4 sec 31 (Natural Surface)	2.50 0.20		
Jeep Rd. in NE1/4NW1/4 sec 24 (Natural Surface)	0.60		
Jeep Rd. in S1/2NW1/4 sec 29 (Natural Surface)	1.00		
Jeep Rd. starts in NE1/4NW1/4 and ends in NW1/4 sec 29 (Natural Surface)			
Jeep Rd. in NE1/4NW1/4 sec 33 (Natural Surface)	0.25		
Jeep Rd. starts in NW1/4NW1/4 and ends in SW1/4NE1/4 sec 33 (Natural Surface)	0.75		
Jeep Rd. starts in SW1/4 T.40S., R.3E., sec31 and ends in SW1/4 T.41S., R.3E., sec 5 (Natural Surface)	1.50		
Jeep Rd. starts in SE1/4NW1/4 T.40S., R.3E., sec 35 and ends in NW1/4NW1/4 T.41S., R.3E., sec 1 (Natural Surface)	1.00 0.33		
Jeep Rd. in NE1/4NE1/4 sec 35 (Natural Surface)			
40-3E-3.1 Segment A (Paved Surface)	0.50	Private	
40-3E-11.0 (Natural Surface)	0.50		
40-3E-12.0 Segment D (Rocked Surface)	0.50		
40-3E-12.3 Segments A&C (Natural Surface)	1.25		
40-3E-23.5 (Natural Surface)	0.50		
40-3E-31.0 Segment B (Natural Surface)	1.00		
40-3E-36.0 (Natural Surface)	0.65		
Jeep Rd. in NE1/4NE1/4 sec 2 (Natural Surface)	0.50		
Jeep Rd. in N1/2N1/2 sec 30 (Natural Surface)	0.50		

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Transportation System Roads (T.40S, R.3E.)	**Approx. miles**	**Access Status**	**Right of Way**
Highway 66 (Paved)	8.00	Other Federal, State, and County Roads	

Transportation System Roads (T.40S., R.4E.)	**Approx. miles**	**Access Status**	**Right of Way**
40-4E-3.0 Segments B, D1, D2, & E (Rocked Surface)	0.75	OPEN	
40-4E-3.1 Segments D&F (Rocked Surface)	0.50		
40-4E-5.0 Segments A & C (Natural Surface)	0.50		OR44944
40-4E-5.0 Segments E1 & E2 (Natural Surface)	0.50		
40-4E-6.0 (Natural Surface)	0.10		
40-4E-7.0 Segments A & C1 (Rocked Surface)	1.00		OR46135
40-4E-7.0 Segments C2, G, H, & I (Rocked Surface)	2.00		
40-4E-7.1 Segment A (Natural Surface)	0.18		OR42492 OR49413 OR50673 OR50687
40-4E-7.1 Segments C (Natural Surface)	0.30		OR14956
40-4E-7.1 Segments I2 (Rocked Surface)	0.30		OR50516
40-4E-7.1 Segments I1, I2, J1, J2, L1, & L2 (Rocked Surface)	2.40		
40-4E-7.2 Segments A & D (Natural Surface)	0.25		OR46135
40-4E-8.0 (Natural Surface)	0.50		
40-4E-17.0 Segments A&C (Rocked Surface)	0.70		
40-4E-19.0 (Natural Surface)	0.75		
40-4E-19.1 (Natural Surface)	0.25		
40-4E-19.2 Segments A, C, & F (Natural Surface)	1.25		
40-4E-19.3 (Rocked Surface)	0.75		
40-4E-19.4 (Natural Surface)	0.10		
40-4E-20.0 (Rocked Surface)	0.25		
40-4E-20.4 Segment B (Natural Surface)	0.20		
40-4E-3.0 Segment C (Rocked Surface)	0.60	RESTRICTED (i.e. may be gated)	
40-4E-5.0 Segment F (Natural Surface)	0.50		
40-4E-6.0 (Natural Surface)	0.60		
40-4E-7.0 Segments B, D, E, & F (Rocked Surface)	0.75		
40-4E-7.1Segments B2, B3, B4, D, E, I, G, H, K, & M (Natural Surface)	3.75		
40-4E-8.0 (Natural Surface)	0.25		
40-4E-17.0 Segment B (Rocked Surface)	0.50		
40-4E-18.0 (Rocked Surface)	0.25		
40-4E-18.1 (Natural Surface)	1.25		
40-4E-19.1 (Natural Surface)	0.50		
40-4E-19.2 Segments B&E (Natural Surface)	0.75		
40-4E-20.0 (Rocked Surface)	1.00		
40-4E-20.1 (Natural Surface)	0.25		
40-4E-20.4 Segment A (Natural Surface)	0.15		
40-4E-30.0 Segment B (Natural Surface)	0.25		
Jeep Rd. in SW1/4 sec 8 (Natural Surface)	0.50		
40-4E-7.3 (Rocked Surface)	0.60	TEMP (i.e. gated)	OR53772
40-4E-9.1 (Natural Surface)	0.25	PERM (i.e. barricade)	
40-4E-17.3 (Natural Surface)	0.25		
40-4E-20.2 (Natural Surface)	0.10		
40-4E-20.3 (Natural Surface)	0.10		

Transportation System Roads (T.40S., R.4E.)	**Approx. miles**	**Access Status**	**Right of Way**
Rd. starts in NE1/4NE1/4 sec 21 and ends in SE1/4SE1/4 sec 28 (Natural Surface)	2.75	OPEN or CLOSED	
Rd. starts in NW1/4NW1/4 sec 22 and ends in SE1/4NE1/4 sec 28 (Natural Surface)	2.75		
Rd. in S1/2SW1/4 sec 27 (Natural Surface)	0.40		
Rd. in SW1/4NW1/4 sec 27 (Natural Surface)	0.25		
Rd. in SE1/4SE1/4 sec 28 (Natural Surface)	0.25		
Rd. in S1/2SE1/4 sec 28 (Natural Surface)	0.35		
Rd. starts in NW1/4SE1/4 sec 28 and ends in NE1/4SE1/4 sec 29 (Natural Surface)	1.00		
Rd. starts in SW1/4NE1/4 sec 28 and ends in NW1/4NW1/4 sec 28 (Natural Surface)	0.75		
Jeep Rds start in NW1/4SE1/4 T.40S., R.4E., sec 31 and end in NE1/4SW1/4 T.41S., R.4E., sec 5 (Natural Surface)	2.67		
40-4E-5.0 Segments B&D (Natural Surface)	1.00	Private	
40-4E-6.0 (Natural Surface)	0.25		
40-4E-9.2 Segment E (Natural Surface)	0.20		
40-4E-7.1 Segment B1 (Natural Surface)	0.56	Other Federal, State, and County Roads	

Transportation System Roads (T.41S., R.2E.)	**Approx. miles**	**Access Status**	**Right of Way**
41-2E-3.0 (Natural Surface)	1.00	OPEN	
41-2E-10.1 Segments D, E, F, G, H, I1, I2, & J (Natural Surface)	13.5		
41-2E-3.1 (Natural Surface)	1.50	SEASONAL (i.e. gated)	
41-2E-9.0 Segments B & C (Natural Surface)	1.50		
41-2E-10.0 (Natural Surface)	1.00		
41-2E-10.1 Segments A, B, & C (Natural Surface)	8.40		
41-2E-10.2 (Natural Surface)	0.25		
41-2E-1.0 (Natural Surface)	0.50	TEMP (i.e. gated)	
41-2E-9.0 Segment A (Natural Surface)	1.50	PERM (i.e. barricade)	
Jeep road starts in NW1/4NW1/4 of sec. 1 and ends in the NE1/4SE1/4 of sec. 1 (Natural Surface)	1.00		
Old Hwy. 99, starting in the NW1/4NE1/4NW1/4 of sec 9 and ends in the NE1/4SW1/4NW1/4 of sec. 9 (Natural Surface)	0.75	OPEN or CLOSED	
41-2E-10.1 Segment H (Natural Surface)	0.10	Private	

Transportation System Roads (T.41S., R.3E.)	**Approx. miles**	**Access Status**	**Right of Way**
Jeep Rd. in NE1/4NW1/4 of sec 7 (Natural Surface)	0.25	OPEN or CLOSED	
Jeep Rd. in W1/2SW1/4 of sec 11 (Natural Surface)	0.50		
Jeep Rd starts in NW1/4NE1/4 sec 1 and ends in NW1/4NE1/4 sec 11 (Natural Surface)	2.00		
Jeep Road starts in NE1/4NW1/4 and ends in SW1/4SE1/4 of sec 1 (Natural Surface)	0.75		

Transportation System Roads (T.41S., R.4E.)	**Approx. miles**	**Access Status**	**Right of Way**
41-4E-3.2 (Natural Surface)	0.25	OPEN	
41-4E-4.0 (Natural Surface)	0.50		
41-4E-9.0 (Natural Surface)	1.25		
Rd is in S1/2NE1/4 of sec 8 (Natural Surface)	0.35	RESTRICTED (i.e. may be gated)	

Jeep Rd. Starts in NE1/4SW1/4 sec 5 and End in N1/4NE1/4 sec 8 (Natural Surface)	1.00	OPEN or CLOSED	
Jeep Rd. Starts in NW1/4SW1/4 sec 5 and Ends in SW1/4SE1/4 sec 6 (Natural)	0.75		
Jeep Rds in SW1/4SW1/4 sec 5 and NE1/4NW1/4 sec 8 (Natural Surface)	1.33		
Jeep Rd. starts in NE1/4 sec 6 (Natural Surface)	0.65		
Jeep Rd. Starts in SW1/4SE1/4 sec 6 and Ends in NW1/4NE1/4 sec 7 (Natural Surface)	0.50		
Jeep Rd. Starts in S1/2NW1/4 sec 7 and goes South into CA (Natural Surface)	0.75		
Jeep Rds in SE1/4, S1/2NE1/4 sec 8 (Natural Surface)	1.83		
Jeep Rd. starts in NW1/4NE1/4 sec 8 and ends in NE1/4SW1/4 sec 7 (Natural Surface)	2.00		
Jeep Rd. in E1/2NE1/4 sec 6 (Natural Surface)	0.50		
Jeep Rd. in W1/2NE1/4 sec 9 (Natural Surface)	0.50		
Jeep			

Access Status Key

! Open -	These road segments are to remain open at all times for all users.
! Seasonal -	These road segments are to remain closed seasonally (during an established time period) to all users
! Restricted -	These road segments have restricted access (BLM and BLM contractors) due to non-exclusive easement or reciprocal agreement. No legal public access is provided and BLM may not control the road.
! Temp -	These road segments are usually closed all year round except for BLM or permittee access.
! Perm -	These road segments are usually closed all year round for all users. The road segment may be needed by BLM or private parties for future access. Some of these roads may be decommissioned in the future.
! Closed	These road segments have been decommissioned or obliterated.
! Open/Closed -	These road segments are non-system roads that may or may not have been constructed by the BLM and generally not controlled by BLM.
! Private -	No legal access to these roads for BLM or public.
! Other federal, State, and County roads	Roads open for all users.

Appendix I - Rangeland Management Standards and Guidelines

STANDARDS FOR RANGELAND HEALTH
AND
GUIDELINES FOR LIVESTOCK
GRAZING MANAGEMENT
FOR
PUBLIC LANDS ADMINISTERED BY THE
BUREAU OF LAND MANAGEMENT
IN THE STATES OF OREGON AND
WASHINGTON

AUGUST 12, 1997

United States Department of the Interior
BUREAU OF LAND MANAGEMENT

Washington DC 20240

MEMORANDUM

To: The Secretary

Through: Bob Armstrong
Assistant Secretary, Land and Minerals Management

From: Director, Bureau of Land Management

Subject: Approval of Oregon/Washington Standards and Guidelines

In accordance with 43 CFR 4180.2(b), the Bureau of Land Management Oregon State Director is submitting the attached Standards for Rangeland Health and Guidelines for Grazing Management for public lands administered in Oregon and Washington for Secretarial approval. The standards and guidelines have been reviewed by the Departmental Review Team who found that they comply with the requirements of the regulations. The standards and guidelines were developed with full public participation and in consultation with Oregon/Washington's resource advisory councils and are in conformance with the appropriate land use plans.

I recommend that you approve the Oregon/Washington Standards for Rangeland Health and Guidelines for Grazing Management.

I concur with your recommendation and approve the Oregon/Washington Standards for Rangeland Health and Guidelines for Grazing Management for immediate implementation.

Approved by: Bruce Babbitt
Date August 12, 1997

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Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington

Introduction

These Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington were developed in consultation with Resource Advisory Councils and Provincial Advisory Committees, tribes and others. These standards and guidelines meet the requirements and intent of 43 Code of Federal Regulations, Subpart 4180 (Rangeland Health) and are to be used as presented, in their entirety. These standards and guidelines are intended to provide a clear statement of agency policy and direction for those who use public lands for livestock grazing, and for those who are responsible for their management and accountable for their condition. Nothing in this document should be interpreted as an abrogation of Federal trust responsibilities in protection of treaty rights of Indian tribes or any other statutory responsibilities including, but not limited to, the Taylor Grazing Act, the Clean Water Act, and the Endangered Species Act.

Fundamentals of Rangeland Health

The objectives of the rangeland health regulations referred to above are: "to promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions; ... and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands."

To help meet these objectives, the regulations on rangeland health identify fundamental principles providing direction to the States, districts, and on-the-ground public land managers and users in the management and use of rangeland ecosystems.

A hierarchy, or order, of ecological function and process exists within each ecosystem. The rangeland ecosystem consists of four primary, interactive components: a physical component, a biological component, a social component, and an economic component. This perspective implies that the physical function of an ecosystem supports the biological health, diversity and productivity of that system. In turn, the interaction of the physical and biological components of the ecosystem provides the basic needs of society and supports economic use and potential.

The Fundamentals of Rangeland Health stated in 43 CFR 4180 are:

1. Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity and the timing and duration of flow.

2. Ecological processes, including the hydrologic cycle, nutrient cycle and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.

3. Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established Bureau of Land Management objectives such as meeting wildlife needs.

4. Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal candidate and other special status species.

The fundamentals of rangeland health combine the basic precepts of physical function and biological health with elements of law relating to water quality, and plant and animal populations and communities. They provide direction in the development and implementation of the standards for rangeland health.

Standards for Rangeland Health

The standards for rangeland health (standards), based on the above fundamentals, are expressions of the physical and biological condition or degree of function necessary to sustain healthy rangeland ecosystems. Although the focus of these standards is on domestic livestock grazing on Bureau of Land Management lands, on-the-ground decisions must consider the effects and impacts of all uses.

Standards that address the physical components of rangeland ecosystems focus on the roles and interactions of geology and landform, soil, climate and water as they govern watershed function and soil stability. The biological components addressed in the standards focus on the roles and interactions of plants, animals and microbes (producers, consumers and decomposers), and their habitats in the ecosystem. The biological component of rangeland ecosystems is supported by physical function of the system, and it is recognized that biological activity also influences and supports many of the ecosystem's physical functions.

Guidance contained in 43 CFR 4180 of the regulations directs management toward the maintenance or restoration of the physical function and biological health of rangeland ecosystems. Focusing on the basic ecological health and function of rangelands is expected to provide for the maintenance, enhancement, or creation of future social and economic options.

The standards are based upon the ecological potential and capability of each site. In assessing a site's condition or degree of function, it must be understood that the evaluation compares each site to its own potential or capability. Potential and capability are defined as follows:

> **Potential**-The highest level of condition or degree of function a site can attain given no political, social or economic constraints.
>
> **Capability**-The highest level of condition or degree of function a site can attain given certain political, social or economic constraints. For example, these constraints might include riparian areas permanently occupied by a highway or railroad bed that prevent the stream's full access to its original flood plain. If such constraints are removed, the site may be able to move toward its potential.

In designing and implementing management strategies to meet the standards of rangeland health, the potential of the site must be identified, and any constraints recognized, in order that plan goals and objectives are realistic and physically and economically achievable.

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Standards and Guidelines in Relation to the Planning Process

The standards apply to the goals of land use plans, activity-plans, and project plans (Allotment Management Plans, Annual Operating Plans, Habitat Management Plans, etc.). They establish the physical and biological conditions or degree of function toward which management of publicly owned rangeland is to be directed. In the development of a plan, direction provided by the standards and the social and economic needs expressed by local communities and individuals are brought together in formulating the goal(s) of that plan.

When the standards and the social and economic goals of the planning participants are woven together in the plan goal(s), the quantifiable, time specific objectives) of the plan are then developed. Objectives describe and quantify the desired future conditions to be achieved within a specified time frame. Each plan objective should address the physical, biological, social and economic elements identified in the plan goal.

Standards apply to all ecological sites and land forms on public rangelands throughout Oregon and Washington. The standards require site-specific information for full on-ground usability. For each standard, a set of indicators is identified for use in tailoring the standards to site-specific situations. These indicators are used for rangeland ecosystem assessments and monitoring and for developing terms and conditions for permits and leases that achieve the plan goal.

Guidelines for livestock grazing management offer guidance in achieving the plan goal and objectives. The guidelines outline practices, methods, techniques and considerations used to ensure that progress is achieved in a way, and at a rate, that meets the plan goal and objectives.

Indicators of Rangeland Health

The condition or degree of function of a site in relation to the standards and its trend toward or away from any standard is determined through the use of reliable and scientifically sound indicators. The consistent application of such indicators can provide an objective view of the condition and trend of a site when used by trained observers. For example, the amount and distribution of ground cover can be used to indicate that infiltration at the soil surface can take place as described in the standard relating to upland watershed function. In applying this indicator, the specific levels of plant cover necessary to support infiltration in a particular soil should be identified using currently available information from reference areas, if they exist; from technical sources like soil survey reports, Ecological Site Inventories, and Ecological Site Descriptions, or from other existing reference materials. Reference areas are lands that best represent the potential of a specific ecological site in both physical function and biological health. In many instances potential reference areas are identified in Ecological Site Descriptions and are referred to as "type locations." In the absence of suitable reference areas, the selection of indicators to be used in measuring or judging condition or function should be made by an interdisciplinary team of experienced professionals and other trained individuals.

Not all indicators identified for each standard are expected to be employed in every situation. Criteria for selecting appropriate indicators and methods of measurement and observation include, but are not limited to: 1. the relationship between the attribute(s) being measured or observed and the desired outcome; 2. the relationship between the activity (e.g., livestock grazing) and the attribute(s) being measured or observed; and 3. funds and workforce available to conduct the measurements or observations.

Assessments and Monitoring

The standards are the basis for assessing and monitoring rangeland condition and trend. Carrying out well-designed assessment and monitoring is critical to restoring or maintaining healthy rangelands and determining trends and conditions.

Assessments are a cursory form of evaluation based on the standards that can be used at different landscape scales. Assessments, conducted by qualified interdisciplinary teams (which may include but are not limited to physical, biological and social specialists, and interagency personnel) with participation from permittees and other interested parties, are appropriate at the watershed and sub watershed levels, at the allotment and pasture levels and on individual ecological sites or groups of sites. Assessments identify the condition or degree of function within the rangeland ecosystem and indicate resource problems and issues that should be monitored or studied in more detail. The results of assessments are a valuable tool for managers in assigning priorities within an administrative area and the subsequent allocation of personnel, money and time in resource monitoring and treatment. The results of assessments may also be used in making management decisions where an obvious problem exists.

Monitoring, which is the well documented and orderly collection, analysis and interpretation of resource data, serves as the basis for determining trends in the condition or degree of function of rangeland resources and for making management decisions. Monitoring should be designed and carried out to identify trends in resource conditions, to point out resource problems, to help indicate the cause of such problems, to point out solutions, and/or to contribute to adaptive management decisions. In cases where monitoring data do not exist, professional judgement, supported by interdisciplinary team recommendation, may be relied upon by the authorized officer in order to take necessary action. Review and evaluation of new information must be an ongoing activity.

To be effective, monitoring must be consistent over time, throughout administrative areas, and in the methods of measurement and observation of selected indicators. Those doing the monitoring must have the knowledge and skill required by the level or intensity of the monitoring being done, as well as the experience to properly interpret the results. Technical support for training must be made available.

Measurability

It is recognized that not every area will immediately meet the standards and that it will sometimes be a long-term process to restore some rangelands to properly functioning condition. It is intended that in cases where standards are not being met, measurable progress should be made toward achieving those standards, and significant progress should be made toward fulfilling the fundamentals of rangeland health. Measurability is defined on a case-specific basis based upon the stated planning objectives (i.e., quantifiable, time specific), taking into account economic and social goals along with the biological and ecological capability of the area. To the extent that a rate of recovery conforms with the planning objectives, the area is allowed the time to meet the standard under the selected management regime.

Implementation

The material contained in this document will be incorporated into existing Land Use Plans and used in the development of new Land Use Plans. According to 43 CFR 4130.3-1, permits and leases shall incorporate terms and conditions that ensure conformance with 43 CFR 4180. Terms and conditions of existing permits and leases will be modified to reflect standards and guidelines at the earliest possible date with priority for modification being at the discretion of the authorized officer. Terms and conditions of new permits and leases will reflect standards and guidelines in their development.

Indicators identified in this document will serve as a focus of interpretation of existing monitoring data and will provide the basis of design for monitoring and assessment techniques, and in the development of monitoring and assessment plans.

The authorized officer shall take appropriate action as soon as practicable but not later than the start of the next grazing year upon determining, through assessment or monitoring by experienced professionals and interdisciplinary teams, that a standard is not being achieved and that livestock are a significant contributing factor to the failure to achieve the standards and conform with the guidelines.

Standards for Rangeland Health

Standard 1 Watershed Function - Uplands

Upland soils exhibit infiltration and permeability rates, moisture storage and stability that are appropriate to soil, climate and landform.

Rationale and Intent

This standard focuses on the basic physical functions of upland soils that support plant growth, the maintenance or development of plant populations and communities, and promote dependable flows of quality water from the watershed.

To achieve and sustain rangeland health, watersheds must function properly. Watersheds consist of three principle components: the uplands, riparian / wetland areas and the aquatic zone. This standard addresses the upland component of the watershed. When functioning properly, within its potential, a watershed captures, stores and safely releases the moisture associated with normal precipitation events (equal to or less than the 25 year, 5 hour event) that falls within its boundaries. Uplands make up the largest part of the watershed and are where most of the moisture received during precipitation events is captured and stored.

While all watersheds consist of similar components and processes, each is unique in its individual makeup. Each watershed displays its own pattern of landform and soil, its unique climate and weather patterns, and its own history of use and current condition. In directing management toward achieving this standard, it is essential to treat each unit of the landscape (soil, ecological site, and watershed) according to its own capability and how it fits with both smaller and larger units of the landscape.

A set of potential indicators has been identified for which site-specific criteria will be used to determine if this standard is being met. The appropriate indicators to be used in determining attainment of the standard should be drawn from the following list.

Potential Indicators

Protection of the soil surface from raindrop impact; detention of overland flow; maintenance of infiltration and permeability, and protection of the soil surface from erosion, consistent with the potential/capability of the site, as evidenced by the:

- amount and distribution of plant cover (including forest canopy cover);
- amount and distribution of plant litter;
- accumulation/incorporation of organic matter;
- amount and distribution of bare ground;
- amount and distribution of rock, stone, and gravel;
- plant composition and community structure;
- thickness and continuity of a horizon;
- character of microrelief;
- presence and integrity of biotic crusts;
- root occupancy of the soil profile;
- biological activity (plant, animal, and insect); and
- absence of accelerated erosion and overland flow.

Soil and plant conditions promote moisture storage as evidenced by:

- amount and distribution of plant cover (including forest canopy cover);
- amount and distribution of plant litter;
- plant composition and community structure; and
- accumulation/incorporation of organic matter.

Standard 2 Watershed Function - Riparian/Wetland Areas

Riparian-wetland areas are in properly functioning physical condition appropriate to soil, climate, and landform.

Rationale and Intent

Riparian-wetland areas are grouped into two major categories: 1. lentic, or standing water systems such as lakes, ponds, seeps, bogs, and meadows; and 2. lotic, or moving water systems such as rivers, streams, and springs. Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Riparian areas commonly occupy the transition zone between the uplands and surface water bodies (the aquatic zone) or permanently saturated wetlands.

Properly functioning condition of riparian and wetland areas describes the degree of physical function of these components of the watershed. Their functionality is important to water quality in the capture and retention of sediment and debris, the detention and detoxification of pollutants, and in moderating seasonal extremes of water temperature. Properly functioning riparian areas and wetlands enhance the timing and duration of streamflow through dissipation of flood energy, improved bank storage, and ground water recharge. Properly functioning condition should not be confused with the Desired Plant Community (DPC) or the Desired Future Condition (DFC) since, in most cases, it is the precursor to these levels of resource condition and is required for their attainment.

A set of indicators has been identified for which site-specific criteria will be used to determine if this standard is being met. The criteria are based upon the potential (or upon the capability where potential cannot be achieved) of individual sites or land forms.

Potential Indicators

Hydrologic, vegetative, and erosional/depositional processes interact in supporting physical function, consistent with the potential or capability of the site, as evidenced by:

- frequency of flood plain/wetland inundation;
- plant composition, age class distribution, and community structure;
- root mass;
- point bars re-vegetating;
- streambank/shoreline stability;
- riparian area width;
- sediment deposition;
- active/stable beaver dams;
- coarse/large woody debris;
- upland watershed conditions;
- frequency/duration of soil saturation; and
- water table fluctuation.

Stream channel characteristics are appropriate for landscape position as evidenced by:

- channel width/depth ratio;
- channel sinuosity;
- gradient;
- rocks and coarse and/or large woody debris;
- overhanging banks;
- pool/riffle ratio;
- pool size and frequency; and
- stream embeddedness.

Standard 3 Ecological Processes

Healthy, productive and diverse plant and animal populations and communities appropriate to soil, climate and landform are supported by ecological processes of nutrient cycling, energy flow and the hydrologic cycle.

Rationale and Intent

This standard addresses the ecological processes of energy flow and nutrient cycling as influenced by existing and desired plant and animal communities without establishing the kinds, amounts or proportions of plant and animal community compositions. While emphasis may be on native species, an ecological site may be capable of supporting a number of different native and introduced plant and animal populations and communities while meeting this standard. This standard also addresses the hydrologic cycle which is essential for plant growth and appropriate levels of energy flow and nutrient cycling. Standards 1 and 2 address the watershed aspects of the hydrologic cycle.

With few exceptions, all life on earth is supported by the energy supplied by the sun and captured by plants in the process of photosynthesis. This energy enters the food chain when plants are consumed by insects and herbivores and passes upward through the food chain to the carnivores. Eventually, the energy reaches the decomposers and is released as the thermal output of decomposition or through oxidation.

The ability of plants to capture sunlight energy, to grow and develop, to play a role in soil development and watershed function, to provide habitat for wildlife and to support economic uses depends on the availability of nutrients and moisture. Nutrients necessary for plant growth are made available to plants through the decomposition and metabolization of organic matter by insects, bacteria and fungi, the weathering of rocks and extraction from the atmosphere. Nutrients are transported through the soil by plant uptake, leaching and by rodent, insect and microbial activity. They follow cyclical patterns as they are used and reused by living organisms.

The ability of rangelands to supply resources and satisfy social and economic needs depends on the buildup and cycling of nutrients over time. Interrupting or slowing nutrient cycling can lead to site degradation, as these lands become increasingly deficient in the nutrients plants require.

Some plant communities, because of past use, frequent fire or other histories of extreme or continued disturbance, are incapable of meeting this standard. For example, shallow-rooted winter annual grasses that completely dominate some sites do not fully occupy the potential rooting depth of some soils, thereby reducing nutrient cycling well below optimum levels. In addition, these plants have a relatively [illegible]

growth period and thus capture less sunlight than [illegible] plant communities. Plant communities like those cited in this example are considered to have crossed the threshold of recovery and often require great expense to be recovered. The cost of recovery must be weighed against the site's potential ecological/economic value in establishing treatment priorities.

The role of fire in natural ecosystems should be considered, whether it acts as a primary driver or only as one of many factors. It may play a significant role in both nutrient cycling and energy flows.

A set of indicators has been identified for which site-specific criteria will be used to determine if this standard is being met.

Potential Indicators

Photosynthesis is effectively occurring throughout the potential growing season, consistent with the potential/capability of the site, as evidenced by plant composition and community structure.
Nutrient cycling is occurring effectively, consistent with the potential/capability of the site, as evidenced by:

- plant composition and community structure;
- accumulation, distribution, incorporation of plant litter and organic matter into the soil;
- animal community structure and composition;
- root occupancy in the soil profile; and
- biological activity including plant growth, herbivory, and rodent, insect and microbial activity.

Standard 4 Water Quality

Surface water and groundwater quality, influenced by agency actions, complies with State water quality standards.

Rationale and Intent

The quality of the water yielded by a watershed is determined by the physical and chemical properties of the geology and soils unique to the watershed, the prevailing climate and weather patterns, current resource conditions, the uses to which the land is put and the quality of the management of those uses. Standards 1, 2 and 3 contribute to attaining this standard.

States are legally required to establish water quality standards and Federal land management agencies are to comply with those standards. In mixed ownership watersheds, agencies, like any other land owners, have limited influence on the quality of the water yielded by the watershed. The actions taken by the agency will contribute to meeting State water quality standards during the period that water crosses agency administered holdings.

Potential Indicators

Water quality meets applicable water quality standards as evidenced by:

- Water temperature;
- dissolved oxygen;
- fecal coliform;
- turbidity;
- pH;
- populations of aquatic organisms; and
- effects on beneficial uses (i.e., effects of management activities on beneficial uses as defined under the Clean Water Act and State implementing regulations).

Standard 5 Native, T&E, and Locally Important Species

Habitats support healthy, productive and diverse populations and communities of native plants and animals (including special status species and species of local importance) appropriate to soil, climate and landform.

Rationale and Intent

Federal agencies are mandated to protect threatened and endangered species and will take appropriate action to avoid the listing of any species. This standard focuses on retaining and restoring native plant and animal (including fish) species, populations and communities (including threatened, endangered and other special status species and species of local importance). In meeting the standard, native plant communities and animal habitats would be spatially distributed across the landscape with a density and frequency of species suitable to ensure reproductive capability and sustainability. Plant populations and communities would exhibit a range of age classes necessary to sustain recruitment and mortality fluctuations.

Potential Indicators

Essential habitat elements for species, populations and communities are present and available, consistent with the potential/capability of the landscape, as evidenced by:

- plant community composition, age class distribution, productivity;
- animal community composition, productivity;
- habitat elements;
- spatial distribution of habitat;
- habitat connectivity; and
- population stability/resilience.

Guidelines for Livestock Grazing Management

Guidelines for livestock grazing management offer guidance in achieving plan goals, meeting standards for rangeland health and fulfilling the fundamentals of rangeland health. Guidelines are applied in accordance with the capabilities of the resource in consultation, cooperation, and coordination with permitees/lessees and the interested public. Guidelines enable managers to adjust grazing management on public lands to meet current and anticipated climatic and biological conditions.

General Guidelines

1. Involve diverse interests in rangeland assessment, planning and monitoring.
2. Assessment and monitoring are essential to the management of rangelands, especially in areas where resource problems exist or issues arise. Monitoring should proceed using a qualitative method of assessment to identify critical, site specific problems or issues using interdisciplinary teams of specialists, managers, and knowledgeable land users.

Once identified, critical, site-specific problems o r issues should be targeted for more intensive, quantitative monitoring or investigation. Priority for monitoring and treatment should be given to those areas that are ecologically at-risk where benefits can be. maximized given existing budgets and other resources.

Livestock Grazing Management

1. The season, timing, frequency, duration and intensity of livestock grazing use should be based on the physical and biological characteristics of the site- and the management unit in order to:
   a. provide adequate cover (live plants, plant lifter and residue) to promote infiltration, conserve soil moisture and to maintain soil stability in upland areas;
   b. provide adequate cover and plant community structure to promote streambank stability, debris and sediment capture, and floodwater energy dissipation in riparian areas.
   c. promote soil surface conditions that support infiltration;
   d. avoid sub-surface soil compaction that retards the movement of water in the soil profile;
   e. help prevent the increase and spread of noxious weeds;
   f. maintain or restore diverse plant populations and communities that fully occupy the potential rooting volume of the soil;
   g. maintain or restore plant communities to promote photosynthesis throughout the potential growing season;
   h. promote soil and site conditions that provide the opportunity for the establishment of desirable plants;
   i. protect or restore water quality; and provide for the life cycle requirements, and maintain or restore the habitat elements of native (including T&E, special status, and locally important species) and desired plants and animals.

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2. Grazing management plans should be tailored to site-specific conditions and plan objectives. Livestock grazing should be coordinated with the timing of precipitation, plant growth and plant form. Soil moisture, plant growth stage and the timing of peak stream flows are key factors in determining when to graze. Response to different grazing strategies varies with differing ecological sites.

3. Grazing management systems should consider nutritional and herd health requirements of the livestock.

4. Integrate grazing management systems into the year-round management strategy and resources of the permittee(s) or lessee(s). Consider the use of collaborative approaches (e.g., Coordinated Resource Management, Working Groups) in this integration.

5. Consider competition for forage and browse among livestock, big game animals, and wild horses in designing and implementing a grazing plan.

6. Provide periodic rest from grazing for rangeland vegetation during critical growth periods to promote plant vigor, reproduction and productivity.

7. Range improvement practices should be prioritized to promote rehabilitation and resolve grazing concerns on transitory grazing land.

8. Consider the potential for conflict between grazing use on public land and adjoining land uses in the design and implementation of a grazing management plan.

Facilitating the Management of Livestock Grazing

1. The use of practices to facilitate the implementation of grazing systems should consider the kind and class of animals managed, indigenous wildlife, wild horses, the terrain and the availability of water. Practices such as fencing, herding, water development, and the placement of salt and supplements (where authorized) are used where appropriate to:

   a. promote livestock distribution;

   b. encourage a uniform level of proper grazing use throughout the grazing unit;

   c. avoid unwanted or damaging concentrations of livestock on streambanks, in riparian areas and other sensitive areas such as highly erodible soils, unique wildlife habitats and plant communities; and

   d. protect water quality.

2. Roads and trails used to facilitate livestock grazing are constructed and maintained in a manner that minimizes the effects on landscape hydrology; concentration of overland flow, erosion and sediment transport are prevented; and subsurface flows are retained.

Accelerating Rangeland Recovery

1. Upland treatments that alter the vegetative composition of a site, like prescribed burning, juniper management and seeding or planting must be based on the potential of the site and should:

a. retain or promote infiltration, permeability, and soil moisture storage;

b. contribute to nutrient cycling and energy flow;

c. protect water quality;

d. help prevent the increase and spread of noxious weeds;

e. contribute to the diversity of plant communities, and plant community composition and structure;

f. support the conservation of T&E, other special status species and species of local importance; and

g. be followed up with grazing management and other treatments that extend the life of the treatment and address the cause of the original treatment need.

2. Seeding and planting of non-native vegetation should only be used in those cases where native species are not available in sufficient quantities; where native species are incapable of maintaining or achieving the standards; or where non-native species are essential to the functional integrity of the site.

3. Structural and vegetative treatments and animal introductions in riparian and wetland areas must be compatible with the capability of the site, including the system's hydrologic regime, and contribute to the maintenance or restoration of properly functioning condition.

Appendix J - Rangeland Trends (with photos)

Table AJ-1 Rangeland Trends as Determined by Nested Frequency Plots for Allotments in CSEEA Area

Allotment	Pasture	Nested Frequency Trend	Date Established	Date last read
Soda Mountain	Skookum	static	1987	1999
	Camp Creek	static	1990	1996
	Oregon Gulch	static	1991	1996
	Agate Flat	upward	1988	1994
	Emigrant	static	1987	1997
Keene Creek	Cottonwood Glades	static	1993	1998
	Wildcat Glades	upward	1988	1992
Siskiyou	All	upward	1990	1998
Agate	All	static	1986	1996
Jenny Creek	All (2 studies)	static to slightly upward	1988	1994
Box R	----------------	----------------	----------------	----------------
Dixie	----------------	----------------	2000	----------------

Trend and rangeland condition as indicators of rangeland health

Static condition indicates that less than a 20% change in vegetational composition of key indicator species has occurred from the time the plot was established to the time of the last reading. In dry uplands an increase of 20% vegetative composition within the nested frequency plot may take years/decades to achieve even though immediate smaller changes may occur. Lower successional stable communities may persist for decades, following the elimination of grazing, with little or no change (Laycock 1989,1991).

Rangeland trend is an important indicator of the health of a rangeland community. Trend has been described as the "direction of change in rangeland condition." An important concern with trend analysis has been that intervals between sampling are often 20 to 30 years. Often only one year of data has been collected. To accurately identify trend, consecutive years of information are needed to smooth out variations in annual climatic fluctuations. Collections of range condition at intervals of no more than 5 years is necessary to effectively monitor trend. The above trend data was collected by utilizing nested frequency plot analysis on a 5 year interval.

Generally, trend is considered to fall into three broad categories: upward (or improving), downward (or declining) or stable (static). This is oftentimes open to interpretation. If livestock grazing is removed, a new equilibrium is formed which may be similar to either the pre-grazed or grazed vegetation (Pieper 1994). Trend ratings were initially used to indicate conditions for livestock grazing as manifested by increasing productivity, cover, and succession towards climax conditions. This was a commonplace use of trend from the 1930's through the early 1970's. At this time a shift in the use of trend in rangeland management was adopted that looked at trend more as an indicator of ecological condition rather than merely an indicator of productivity for a commodity, in this case the amount of livestock forage produced. In both cases improved trend generally equated to improved conditions for other aspects of rangelands such as wildlife forage, hiding and thermal cover for wildlife, improved watershed function and condition, improved riparian health, improved water quality, etc.

In some cases, a downward trend for some uses might equate to an upward trend for other uses. A case in point would be early seral species. Such species may require disturbance in order to become established. Not all of these species are considered noxious weeds or invasive species. Some cryptogams may well require a low seral state typified by low nutrient availability to maintain community structure. If this is the desired community that we are managing for, then it is necessary to set back or hold succession in place so that this stable ecological state can exist. A static or stable trend may also be desirable if the existing community provides the essential vegetative / ecological conditions for the species of concern. This is the case for such species as sage-grouse and pronghorn antelope, which prefer forbs over grasses in their diet (no evidence exists of sage-grouse feeding on grasses, although they are important for hiding / nesting cover) and which require certain species of sage-brush for both food and cover. A species found in the CSEEA area that requires disturbance which creates brush fields and forb dominated communities is the mountain quail. Forested areas in Idaho and western Montana provided excellent wildlife habitat after the stand replacing fires of 1910. However, elk populations in these areas are now on the decline and these sub-climax conditions must be artificially maintained to support the elk populations unless society is willing to allow natural stand replacing fires to exist. With the increase in urban/rural/wildland interface, this is an unlikely occurrence. Similar conditions exist throughout much of the CSSEA area.

Effects of grazing on biodiversity

Prescribed grazing and fire, along with silvicultural prescriptions, give managers the necessary tools to ensure greater biodiversity across the landscape. Rambo and Faeth (1999) found that elk, deer, and cattle grazing increased plant species richness, even in a nutrient- poor, semi-arid grassland. Natural disturbances such as herbivory (grazing) and fire may increase species diversity by reducing competition from dominant species, thus allowing rarer species to exist ,or by creating patches of habitat at differing seral states, allowing the co-existence of species from early, mid, and late seral states. This is often the objective of the land manager, especially when increasing biodiversity while maintaining ecological integrity is the goal. Overt suppression of large-scale natural disturbances, such as fire and flooding, may diminish diversity. Examples of this are evident within the CSEEA area, particularly Jenny Creek (Menke 1999, this manuscript). However, catastrophic disturbances have the potential to extirpate local populations and reduce species biodiversity on the small scale. Based on this evidence, it has been hypothesized that intermediate disturbances support higher species diversity than do rare or more frequent events or disturbances which occur at higher or lower levels of intensity.

Herbivory, in this case by wild and domestic ungulates, is one such disturbance that may increase plant diversity and associated faunal diversity by reducing competitive dominants and allowing rare species to exist, or by ameliorating the effects of other diversity reducing disturbances such as fire (Menke 1999 this manuscript). Herbivory may also stimulate plant productivity. This is not to say that improperly managed livestock management is without negative ecological implications. Vertebrate herbivory does not always increase plant diversity and may occasionally decrease it. Recent models suggest that variability in the effects of large herbivores on plant diversity depends on spatial scale and environmental gradients of soil nutrients and moisture. In addition, the effects of season of use, duration and intensity of herbivory, type and class of herbivore, morphological characteristics of plants and the number of times the individual plant is clipped during the season of active growth (Pieper 1994) must be taken into consideration when determining the effects of herbivory. These factors are all taken into consideration when designing a grazing system.

When assessing the effects of grazing on biodiversity it is necessary to recognize the following principles:
(1) plants are distributed in patches, (2) grazing usually increases the patchiness of vegetation, (3) diversity of habitats (patchiness) and ecotones or edges where different vegetation types meet are important as wildlife habitat and create diversity on a landscape level, and (4) grazing generally reduces a few dominants in a system and they are replaced by more numerous secondary species. In many cases these secondary species are made up of rare, threatened, and endangered plants.

Livestock grazing as a tool to improve wildlife habitat

Livestock grazing has long been considered an effective tool for managing wildlife habitat. Clark et al. (2000) found that the quality of native forages is often below maintenance levels for wintering elk. However, late spring grazing by livestock improved winter levels of digestible protein in bluebunch wheatgrass, Idaho fescue, and elk sedge, and in-vitro digestibility in bluebunch wheatgrass. Willow communities should be maintained in partially open stands for deer. This objective requires that meadow-riparian areas be grazed at moderate levels. Livestock can be used to:
Create early seral patches as feeding sites for upland birds or concentrate ungulate feeders (i.e. deer, elk).Through planned rest periods, maintain sites of tall residual grass cover as nesting sites for upland birds and waterfowl.

1. Promote the regrowth of grasses, which are more nutritious for grass eating wild ungulates than standing dead material.

2. Reduce the volume of unwanted, standing dead material to increase access by wildlife to forbs or lower green leaves.

3. Stimulate lateral sprouting of shrubs as desired forage for wintering ungulates.

4. Create horizontal structural diversity (patchiness) of the herb layers as desired edge effect for birds (mean height of grass and its standard deviation is a good predictor for bird diversity).

5. Prevent shifts to seral states which do not meet habitat requirements so that habitats for selected wildlife species are maintained.

6. Prevent shifts to lower / higher seral stages which might maintain more suitable habitat for species favoring grazing disturbance.

7. Create bare ground as feeding, dusting, and display sites for upland and passerine birds .

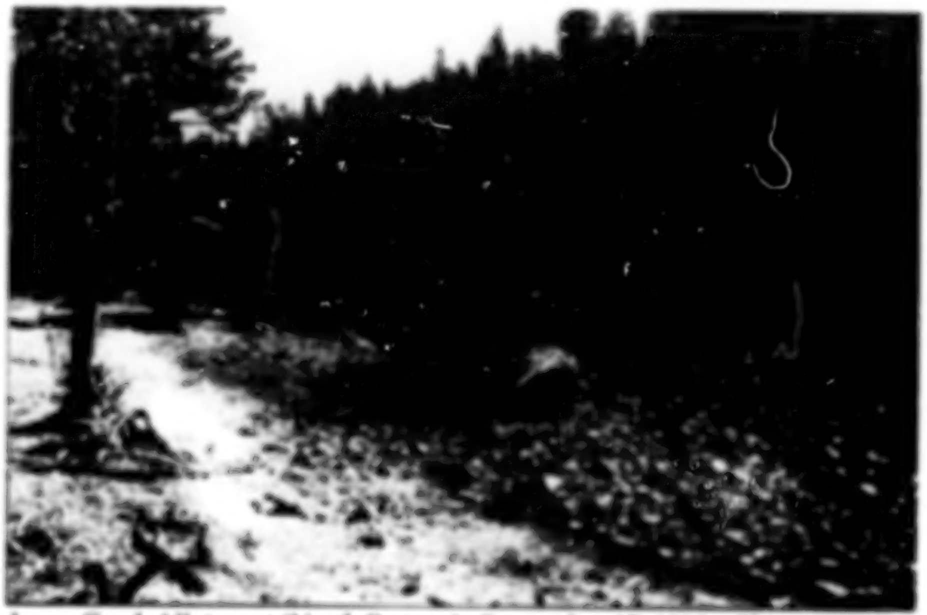
8. Create brushier forms of trees and shrubs as better concealment for escape.

9. Increase production of shrubs by removing competing understory.

Herbivory as a keystone ecological process

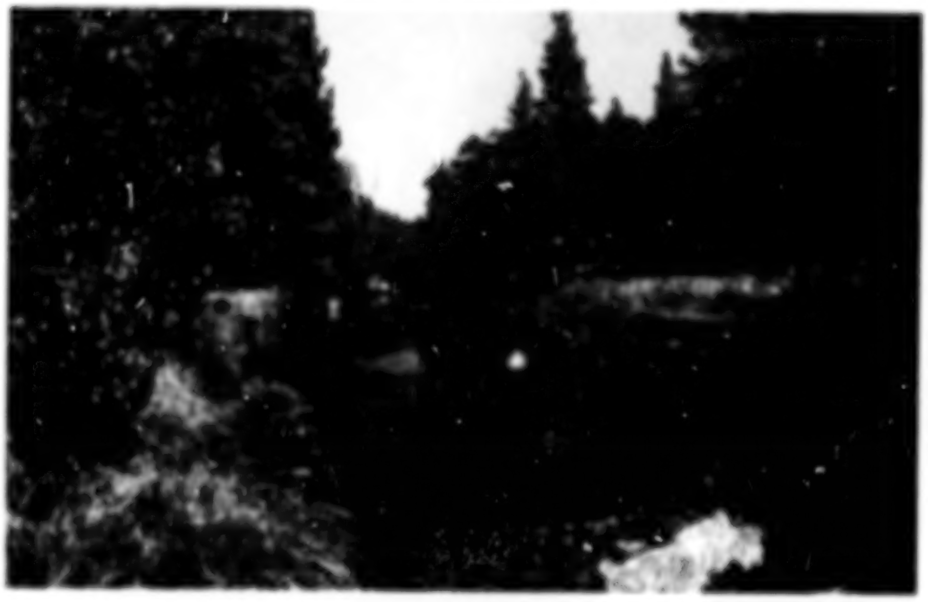
The question of whether livestock grazing is an ecologically sustainable process has come to the forefront. Herbivory is an important and nearly universal ecosystem process (Pieper 1994). Consequently, some scientists view herbivores as regulators, occupying a central position in ecosystems. Livestock are often viewed as if they are not a part of rangeland ecosystems, but rather some intrinsic factor (Pieper 1994). Livestock, if properly managed, can act as surrogate herbivores within a given ecosystem. It is the role of prescribed grazing to determine the proper application of grazing as a ecologically based management tool.

Figure AJ.1



Jenny Creek Allotment (North Pasture): September 17, 1980. Photo prior to implementing grazing plan. Note the oak woodland slope as reference point for photo comparison.

Figure AJ.2



Jenny Creek Allotment (North Pasture): Septembe [illegible] 98. Stream bank vegetation has grown over rendering little comparison to original photo.

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Figure AJ.3

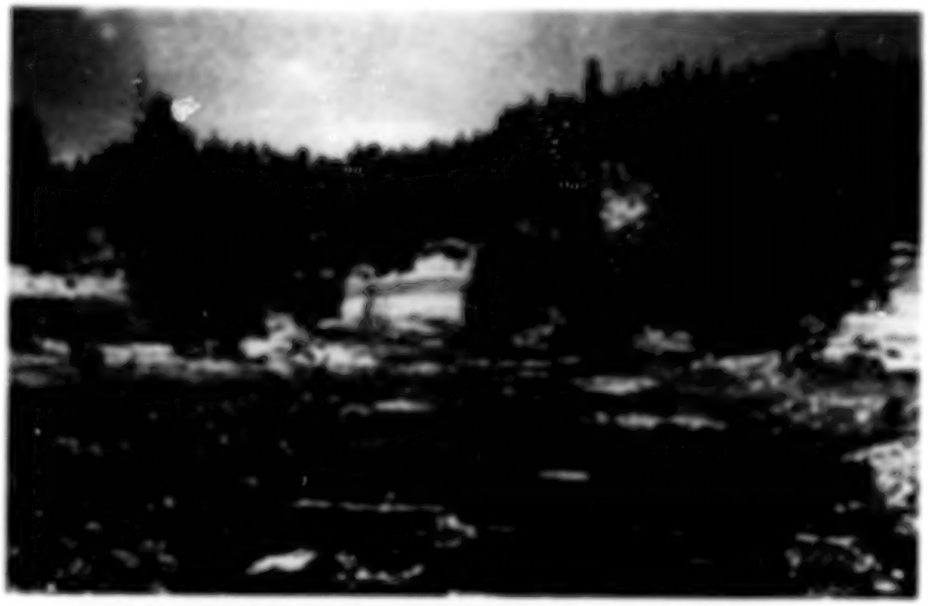

Photo of Jenny Creek (Box O Ranch) taken July 16, 1974. Ranch under private ownership at this time.

Figure AJ.4

Photo of Jenny Creek (Box O Ranch) October 28, 1999. Photo retaken after four years of Bureau of Land Management ownership. Notice willow establishment and increased bank stability.

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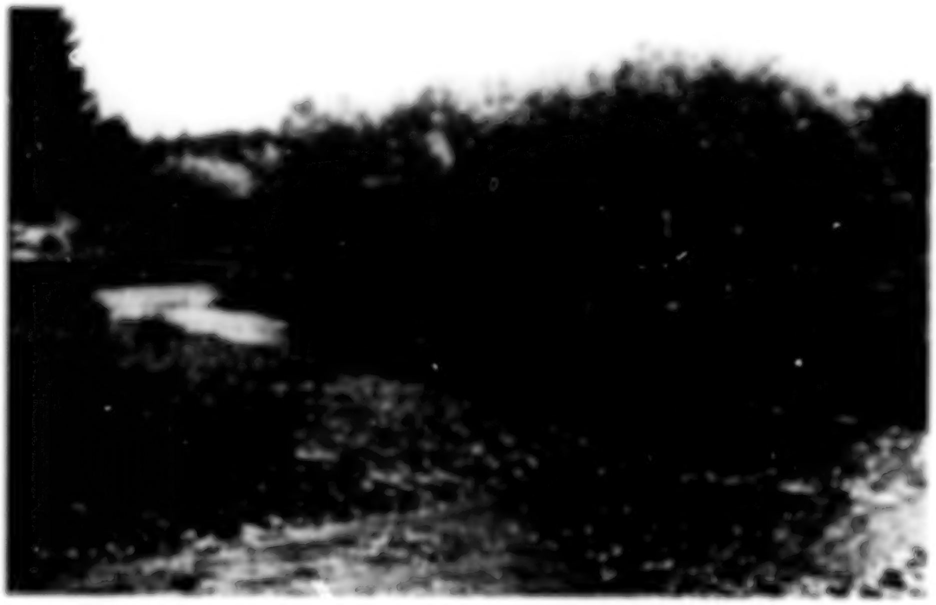
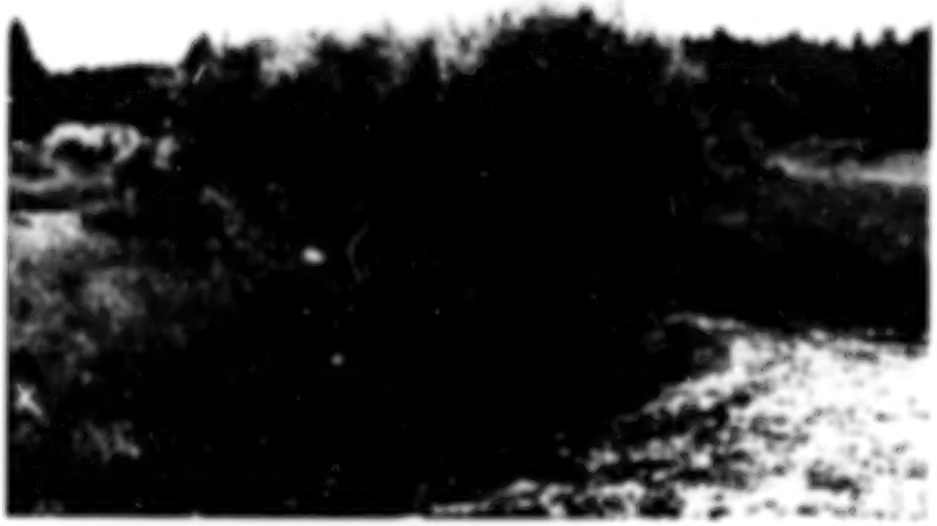
Figure AJ.5



Keene Creek Allotment: September 5, 1975. Picture taken below Little Hyatt Reservoir and adjacent to study area indicating riparian trend.

Figure AJ.6



Keene Creek Allotment: August 24, 1998. Retake of photo on Keene Creek after changes in cattle management.

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Figure AJ.7

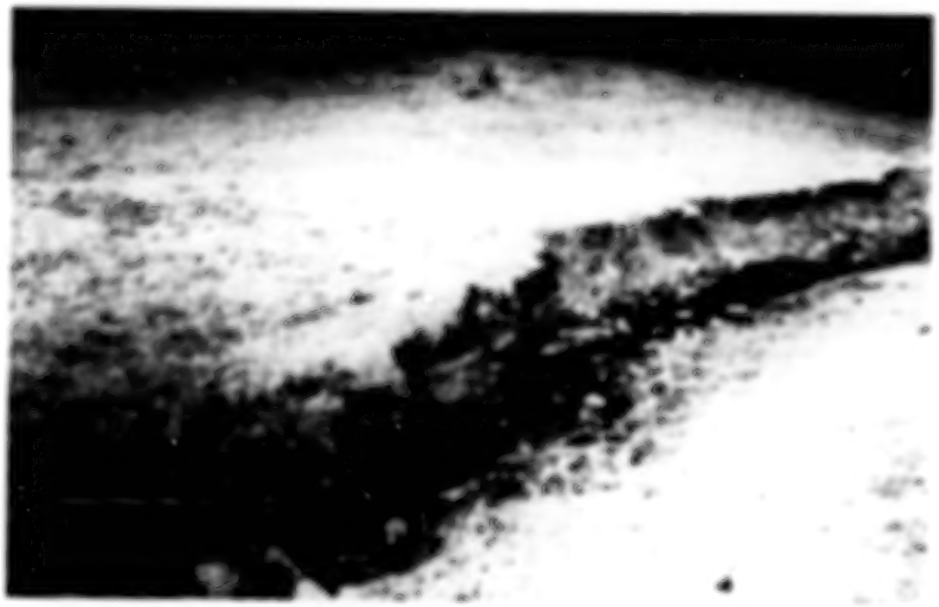

Photo taken September 14, 1981. Lower Station Dead Indian Creek. Photo indicates recovery potential of riparian systems.

Figure AJ.8

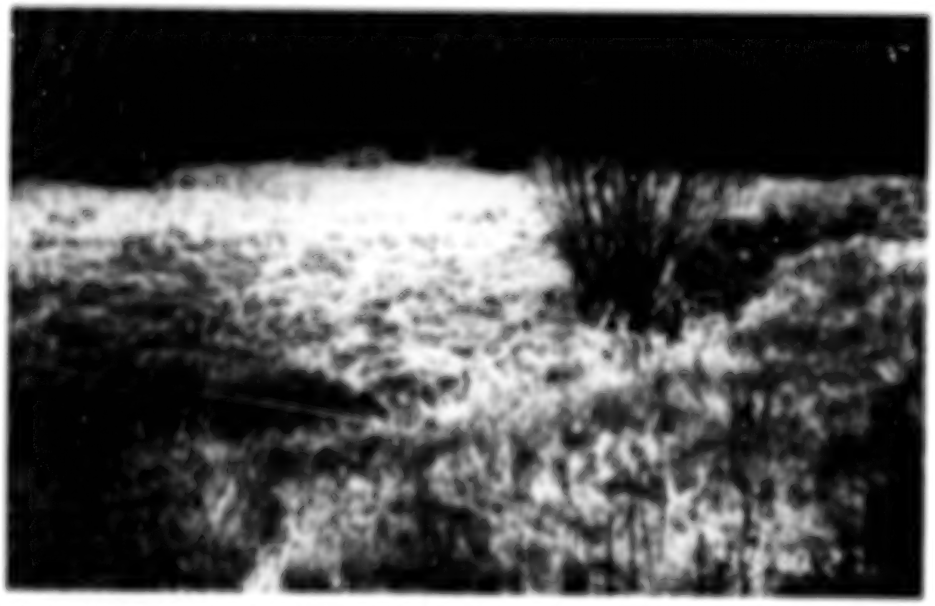

Photo taken October 27, 1999. Lower Station Dead Indian Creek. Notice the channel narrowing and establishment of willow.

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Appendix K - Soda Mountain Communication Site Photos

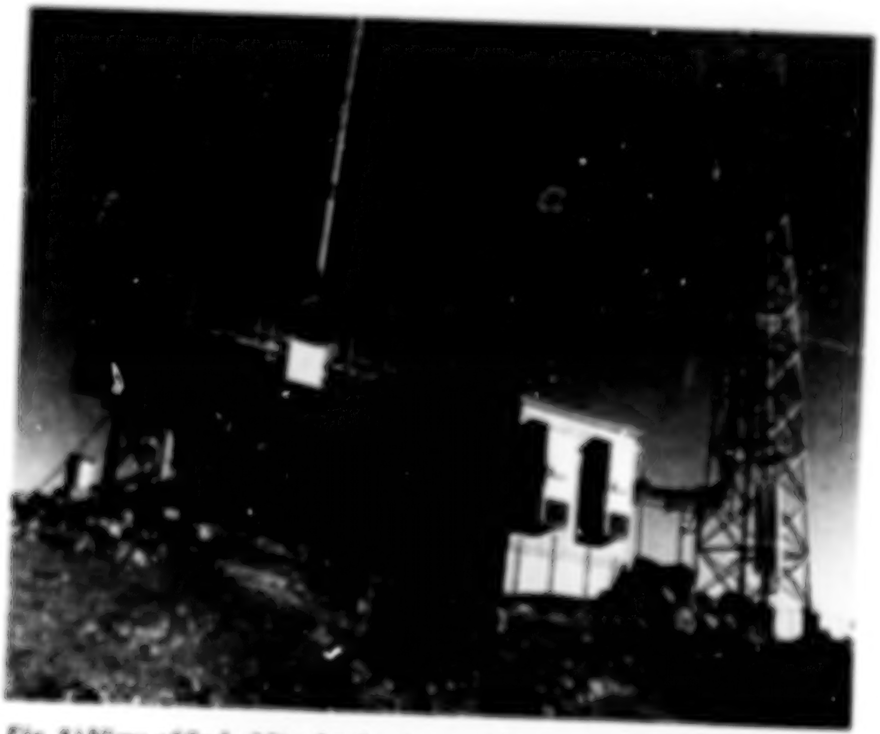

Fig. 1) View of Soda Mtn. Lookout owned by Oregon Dept. of Forestry. Communications building and tower owned by AT&T Wireless.

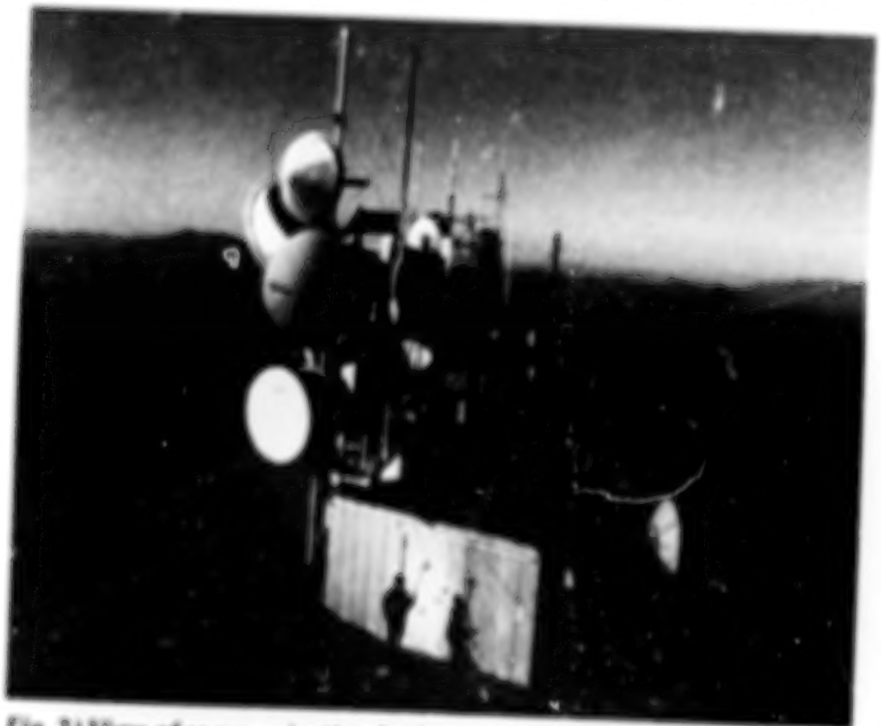

Fig. 2) View of communication facilities from Soda Mtn. Lookout. View is looking down main ridge (SW). Pilot Rock on right.

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Appendix L - Site Authorization Table

Table AL-1. Authorized Uses Occurring in the Proposed CSEEA

OR\ORE #	HOLDER	TYPE or USE	REMARKS
20137	US West	Communication Site	
34999	Or. Highway Dept.	Communication Site	
36203	COBI*	Communication Site	with sub-lessee
38053	PP&L	Communication Site	
44980	ODF	Communication Site	with sub-lessee
48563	AT&T Wireless	Communication Site	with sub-lessee
49604	US Cellular	Communication Site	
54336	SOU (JPR)**	Communication Site	with sub-lessees
17317	PP&L	Utility Line	
20544	PP&L	Utility Line	Line 19 (115 kV)
24416	PP&L	Utility Line	Line 59 (230 kV)
24876	US West	Utility Line	
26313	C. & H. Honingford	Road	Soda Mtn. Road
34269	US West	Utility Line	
37585	R. Taylor	Ditch	
42014	US Sprint	Fiber Optic Line	
43005	S. Young	Water Line	
43975	AT&T	Fiber Optic Line	
45363	L. Tynes	Road	Private Access Road
46542	PP&L	Fiber Optic Line	
47421	MCI	Road	Soda Mtn. Road
47454	PP&L	Utility Line	
48560	PP&L	Utility Line	
50516	C. & M. McLaughlin	Road	BLM Road #40-3E-3
54223	MGeorge/K Freeman	Road	Soda Mtn. Road
0497	US West	Utility Line	
03235	R. Taylor	Water Facility	
06936	Bur. of Reclamation	Canal	

Table AL-1. Authorized Uses Occurring in the Proposed CSEEA

OR\ORE #	HOLDER	TYPE or USE	REMARKS
013754	Or. Highway Dept.	Interstate Highway	I-5
R011947	US West	Utility Line	
R022462	Or. Highway Dept.	State Highway	Old Highway 99
R023045	Or. Highway Dept.	Interstate Highway	I-5
5439	US West	Utility Line	
13745	PacifiCorp	Transmission Line	500 kv line
14956	US West	Utility Line	
18550	SOPTV***	Communication Site	Chestnut Mtn.
23467	State of Oregon	Communication Site	Chestnut Mtn.
24498	M. McLaughlin	Water Line	
35917	US West	Utility Line	
36695	US West	Utility Line	
36784	State of Oregon	Airport Lease	Pinehurst Airstrip
37836	M. McLaughlin	Water Line	
41384	Grant Willey	Road	
42492	Corral Cr. HOA****	Road	
44944	Don Rowlett	Road	
45379	Bur. of Reclamation	Canal	
45385	D. Cleland	Road	
45999	Kurt Stark	Road	
46135	J. Wah	Road	
48248	Don Rowlett	Ditch	
49214	D. Ragnell	Road	
49413	Ed Milsom	Road	
50516	M. McLaughlin	Road	
50673	Roskamp Services	Road	
50687	H. Cassells	Road	
53772	S. Tall Hunter	Road	

Table AL-1. Authorized Uses Occurring in the Proposed CSEEA

OR\ORE #	HOLDER	TYPE or USE	REMARKS
03490	PacifiCorp	Utility Line	
05569	US West	Communication Site	Chestnut Mtn.
05609	PacifiCorp	Utility Line	
06936	Bur. of Reclamation	Canal and Laterals	
012019	PacifiCorp	Utility Line	
013626	Pinehurst School	R&PP Lease*****	Elementary School
013794	Or. Highway Dept.	Maintenance Facility	Highway 66
R014637	Bur. of Reclamation	Hyatt Reservoir	

* California-Oregon Broadcasting, Inc. * Southern Oregon University, Jefferson Public Radio
*** Southern Oregon Public Television **** Home Owner's Association
***** Recreation and Public Purposes Act

Appendix M- Statistical and Demographic Data

A Statistical Overview of Selected Social and Economic Characteristics of the CSEAA and of Jackson County

This appendix presents statistical and demographic data related to social and economic conditions in the CSEEA area and in Jackson County, Oregon. Much of the discussion and conclusions related to these data is contained in Chapter 2.

Appendix M1--Data Census

Table AM - 1. 1990 Census Data

Category	Pinehurst/Greensprings #	(%)	Jackson County #	(%)	State of Oregon #	(%)
Population	1205		146,389		2,842,321	
Population by Ethnic Group						
White	1182	99	140,188	95.8	2,636,787	92
Black	4	<1	340	<1	46,178	<1
American Indian	4	<1			38,496	<1
Asian/Pac Islander	7	<1			69,269	2
Hispanic	25	2.1	5861	4.0	112,707	4
Other	8	<1			51,591	1.8
Age Group Distribution						
0-17	335	27.8	36,705	25.1	724,130	25.8
18-64	744		85,972		1,726,867	
65+	126	10.5	23,712	16.2	391,324	13.8
Median age	38.7		36.7		34.5	
Education						
Postgraduate	125	15.5	5,806	5.9	129,545	6.9
College Degree	135	16.7	11,389	11.7	252,626	13.4
Some College	261	32.3	29,414	30.1	592,902	31.4
High School Diploma	145	17.8	31,547	32.3	536,687	28.5
Less than High School	143	17.7	19,448	19.9	343,609	18.2
Total 25+	809		97,604		1,885,369	
Household Income (1989)						
Households	409		57,400		1,105,362	
Less than $5,000	6	1.5	3,467	6.0	60,824	5.5
$5,000 to $9,999	36	8.8	6,511	11.3	108,006	9.8
$10,000 to $14,999	17	4.2	6,786	11.8	112,425	10.2
$15,009 to $24,999	74	18.1	11,856	21.0	222,693	20.1
$25,000 to $34,999	75	18.3	10,090	17.6	194,886	17.6
$35,000 to $49,999	93	22.7	10,191	17.8	194,702	18.1
$50,000 to $74,999	54	13.2	5,841	10.2	138,482	12.5
$75,000 to $99,999	30	7.3	1,427	2.5	37,088	3.4
$100,000 to $149,999	8	2.0	765	1.3	19,624	1.8
$150,000 or more	16	3.9	466	0.8	11,632	1.1
Median HH Income ($)	34,375		25,069		27,250	

Table AM - 1. 1990 Census Data						
Category	**Pinehurst/Greensprings**		**Jackson County**		**State of Oregon**	
	#	**(%)**	**#**	**(%)**	**#**	**(%)**
Income Type in 1989						
Households	409		57,400		1,105,362	
With wage/salary income	327	80.0	40,551	70.6	885,621	75.6
With nonfarm self-emp.	96	23.5	8,700	15.2	159,941	14.5
With farm self-emp inc.	38	9.3	1,392	2.4	33,146	3.0
With Social Security inc.	86	21.0	18,276	31.8	306,040	27.7
With public assistance inc	29	7.1	3,799	6.6	66,998	6.1
With retirement income	70	17.1	10,905	19.0	185,721	16.8
Poverty Rate/Persons						
	55 of 1,246	4.4	18,925/ 143,025	13.2	344,867/ 2,775,907	12.4
Housing						
Total Occupied Units	430		57,238		1,103,313	
Owner Total	346	80.5	37,920	66.2	695,957	63.1
Rental Total	84	19.5	19,318	33.8	407,356	36.9
Monthly Owner Cost as Percent of Household Income in 1989						
Total specified housing units	197		25,057		516,057	
Less than 20%	102	51.8	13,348	53.3	290,891	56.4
20-24%	0	0	3,988	15.9	79,398	15.4
25-29%	40	20.3	2,407	9.6	49,947	9.7
30-34%	13	6.6	1,309	5.2	28,884	5.6
35% or more	42	21.3	3,810	15.2	63,948	12.4
Not computed	0		195	0.8	2,989	0.6
Gross Rent as Percent of Household Income in 1989						
Total specified units	58		18,549		394,927	
Less than 20%	43	74.1	5,165	27.8	127,587	32.3
20-24%	7	12.1	2,449	13.2	56,614	14.3
25-29%	0		2,211	11.9	45,026	11.4
30-34%	0		1,532	8.3	30,105	7.6
35% or more	0		6,200	33.4	117,192	30.0
Not computed	8	13.8	992	5.3	18,403	4.7
Persons per Household (Housing units / pop)						
	2.94		2.55		2.57	
Mean travel to work (min)						
	19.7		16.7		19.6	
Self-employed						
	89 of 535	16.6	6,922/ 62,704	11.0	122,886/ 1,319,960	9.3

Source: 1990 Census Data, with assistance from Southern Oregon University Regional Services Institute and http://govinfo.orst.edu/stateis.html.

Appendix M2--Intercensal Estimate of Poverty

Table AM - 2. Estimates of Poverty by School District: 1995

Area/District Name	Poverty rate for children, 5 to 17 years of age	Statewide Rank*
Oregon	13.0	—
Jackson County	14.9	—
Eagle Point	21.4	208
Rogue River	17.9	189
Pinehurst	16.7	170
Ashland	15.4	149
Medford	14.8	138
Phoenix-Talent	13.9	127
Butte Falls	13.3	115
Prospect	9.4	67
Central Point	7.0	39
Josephine County	23.1	—
Grants Pass	22.6	218
Three Rivers	22.4	214

*Out of 236 districts reported

Source: U.S. Census Bureau, February 1999

Table AM-3. A Comparison of Occupational Structures, Pinehurst/Greensprings, Jackson County and State of Oregon Using 1990 Census Data

Industry Category	Pinehurst/ Greensprings CT25, BG1		Jackson County		State of Oregon	
	#	%	#	%	#	%
Employed persons 16 yrs & over	535		62,704		1,319,960	
Agriculture, forestry, & fisheries	25	4.7	3,101	4.9	66,730	5.1
Mining	15	2.8	121	0.2	2,479	0.2
Construction	45	8.4	3,908	6.2	74,206	5.6
Manufacturing, nondurable goods	25	4.7	1,740	2.8	61,873	4.7
Manuracturing, durable goods	36	6.7	7,724	12.3	171,335	13.0
Transportation	8	1.5	2,527	4.0	55,283	4.2
Communication & othr pub util	9	1.7	1,261	2.0	31,006	2.3
Wholesale trade	9	1.7	2,667	4.3	61,938	4.7
Retail trade	88	16.4	14,094	22.5	239,010	18.2
Finance, insurance, real estate	25	4.7	3,319	5.3	78,671	6.0
Business and repair services	21	3.9	2,775	4.4	60,660	4.6
Personal services	41	7.7	2,245	3.6	40,768	3.1
Entertainment & recreation serv.	14	2.6	1,114	1.8	17,650	1.3
Health services	50	9.3	5,404	8.6	103,623	7.9
Educational services	81	15.1	4,840	7.7	112,018	8.4
Other professional, rel. services	37	6.9	3,482	5.6	88,577	6.7
Public administration	6	1.1	2,382	3.8	54,133	4.1

Source: 1990 Census, obtained through Southern Oregon Regional Services Institute (SORSI).

The Regional Economic Picture

The regional economy of southern Oregon has been undergoing profound shifts in the last thirty years. The traditional economic sectors of timber production, agriculture, fishing and mining have experienced modest to significant decline, while the trades and services sectors related to recreation, tourism, retirement and computer technology have shown dramatic increases. Regional economists have generally come to believe that the Northwest economy has diversified and matured because of these developments. The traditional sectors will continue to play an important role in the regional economy, while economic choices for average people are widening in significant ways.

A 1995 paper by over 30 economists of the Northwest, almost all affiliated with academic institutions, outlined a consensus position on economic well-being and environmental protection in the Northwest (Pacific Northwest Economists, 1995). They presented information that showed that personal income (labor income, dividends, rent, interest and retirement income) in the region as a whole grew 2.2 times faster than the national average between 1988 and 1994. They also pointed to migration studies that show people moving to this area for quality of life reasons.

Appendix M4 - - Jackson County Economy

Table AM - 4. Jackson County Occupational Structure, 1970-1998

	1970	1980	1981	1982	1983	1984	1985	1986	1987
Civilian Labor Force	37,240	63,070	65,120	63,820	63,800	64,380	64,060	66,560	69,430
Unemployment	3,040	6,510	8,260	9,220	7,670	6,460	6,000	5,690	4,460
Total Wage and Salary Emp.	26,500	43,500	42,140	39,390	40,790	43,260	44,620	46,770	49,380
Total Manufacturing	6,010	7,690	7,240	6,280	7,550	8,430	8,240	8,390	8,990
Lumber & Wood Products	4,570	5,030	4,700	3,880	4,750	5,100	5,290	5,440	5,910
Other Manufacturing	1,440	2,660	2,540	2,400	2,800	3,330	2,950	2,950	3,080
Total Non-Manufacturing	20,490	35,810	34,900	33,110	33,240	34,830	36,380	38,380	40,390
Const. & Mining	810	1,960	1,320	990	1,040	1,120	1,470	1,780	1,700
Trans., Comm. & Utilities	1,590	2,240	2,160	2,090	2,160	2,350	2,550	2,720	2,790
Trade	6,600	11,890	11,840	11,000	11,280	11,970	12,450	13,240	14,160
Finance, Ins. & Real Est.	980	2,230	2,230	2,170	2,160	2,250	2,190	2,260	2,420
Services & Misc.	4,500	8,040	8,370	8,200	8,460	8,970	9,250	9,730	10,460
Government	6,010	9,450	8,980	8,660	8,140	8,170	8,480	8,650	8,860

Table AM - 4. Jackson County Occupational Structure, 1970-1998

	1990	1991	1992	1993	1994	1995	1996	1997	1998	% Change 1970-1998
Civilian Labor Force	73,430	74,820	76,340	79,520	82,390	82,510	86,280	86,690	88,090	
Unemployment	4,950	5,700	6,320	6,850	5,530	5,400	7,100	6,580	5,980	-1.4
Total Wage and Salary Emp.	54,840	54,710	56,810	58,620	61,990	63,570	65,520	67,980	69,850	8.1
Total Manufacturing	8,920	8,150	8,790	8,650	9,050	9,140	9,130	9,320	9,220	-5.6
Lumber & Wood Products	5,370	4,690	5,140	4,740	4,720	4,600	4,500	4,410	4,190	-7.5
Other Manufacturing	3,550	3,460	3,650	3,910	4,330	4,540	4,630	4,910	5,030	1.8
Total Non-Manufacturing	45,920	46,560	48,020	49,970	52,940	54,430	56,390	58,650	60,630	13.8
Const. & Mining	2,150	2,060	2,100	2,420	2,710	2,790	2,980	3,270	3,370	1.6
Trans., Comm. & Utilities	2,920	2,950	2,850	2,870	2,880	3,080	3,250	3,310	3,450	-0.4
Trade	16,160	16,320	16,670	17,190	18,640	19,090	19,510	20,110	20,460	5.5
Finance, Ins. & Real Est.	2,620	2,660	2,710	2,870	3,020	2,990	3,030	3,070	3,080	0.9
Services & Misc.	12,530	12,910	13,860	14,690	15,620	16,240	17,280	18,430	19,320	9.9
Government	9,530	9,660	9,820	9,930	10,070	10,240	10,350	10,470	10,930	-3.7

Appendix M5--Cattle Numbers in Jackson County

Table AM - 5. Number and Value of Cattle and Calves in Jackson County and Oregon for Selected Years

Year	Head All Cattle and Calves	
	Jackson	Oregon
1960	49,000	1,421,000
1970	44,000	1,514,000
1993	34,000	1,380,000
1994r	35,000	1,410,000
1995r	40,090	1,470,000
1996p	42,770	1,460,000
Year	**Value of Cattle and Calves Sold (000's)**	
	Jackson	Oregon
1960	2,446	80,324
1970	4,245	140,284
1993	9,874	402,700
1994r	8,783	376,683
1995r	8,783	376,683
1996p	7,906	252,141

Source: Oregon State University. August, 1997. Commodity Data Sheet, Cattle, Extension Economic Information Office. Publication 9140-96. Corvallis, OR. Also available on the web at: http://osu.orst.edu/dept/EconInfo/.

Recreation and Tourism

Unlike many other sectors, tourism is a category of economic activity that incorporates several Standard Industrial Classifications (SIC), and furthermore, it is derived not by the goods and services purchased, but by the residence of the consumer. Consequently, it is a sector whose contribution to the economy has always been difficult to measure. Estimates of tourism-related employment are based on the analysis of tourism expenditures and the allocation of such spending across several industrial categories, typically lodging, eating/drinking establishments, food stores, auto/transport expenses, recreation, and retail sales. In both Jackson and Josephine Counties, the overall rate of tourism employment was 4.5% of total employment in 1992. Tourism employment expanded by 16% in Jackson County between 1987 and 1992, comparable to the state's overall employment increase for the same period. Tourism employment in Jackson County increased its share of employment from 3.8% in 1987 to 4.5% in 1992 (Reid and Flagg 1995: 34).

SORSI developed a profile of summer visitors in 1996 based on interviews at Lithia Park, the Oregon Caves, Jacksonville, State and County Parks and other sites throughout the two-country region (Reid and Lucas 1997b). They compared results of this survey to a similar one of 1990 to determine if visiting patterns had changed. They had. The share of California visitation dropped from 51% to 46% and the share of visitation from Oregon and Washington correspondingly rose. Both surveys pointed to the preponderance of visitors from couple households and households without children. The share of repeat visitors increased from 71% to 80% between 1990 and 1996. Both studies showed a predominance of visitors who lived within a day's drive of the region. One third of summer visitors used motel accommodations, followed in order of importance by reliance on camping/RV, friends/relatives, day use, and bed and breakfast inns.

SORSI conducted a study of motel visitors to the cities of Jackson and Josephine Counties (Reid and Lucas 1997c) and found that travelers in the off season were more often without children, were senior citizens, or were business travelers. Off-season visitors were also wealthier and better educated than their summer counterparts. In terms of repeat business, 88% of off-season visitors had visited the area before, reflecting their business and pass-through reasons. Ashland had the highest percentage of repeat visitors, and Grants Pass the lowest. The primary reasons for off season visits were ranked as follows: traveling through, vacation/pleasure, business/work, friends/relatives, relocation, and shopping. Median length of stay for both summer and off-season visitors was 2 nights. Activities enjoyed most by visitors were ranked from most to least favorite: cultural, historic, passive outdoor, active outdoor, water-related, relax/sightseeing, and shopping and eating out. Visitors relied most on past experience and word of mouth in deciding to visit the area, but over 30% relied on automobile clubs, travel literature and chambers of commerce/visitors centers.

Appendix N - Other Economic Sectors

The health services sector increased by 2,500 jobs (44%) from 1987 to 1997 in the two –county region, in such areas as managed care, specialty clinics, outpatient services, as well as physicians' and other practitioners' offices (Anderson 1998: 25).

Although state employment in health services averages 7% of the labor force, in Jackson County it was 9% in 1993, exceeding lumber and wood products employment. The average wages paid to a health services worker is 19% above the county overall per capita wage, more than keeping up with the inflation rate. Health services employment in Jackson County increased by 73% from 1986 to 1993, while the sector increased 61% for the state as a whole (Reid and Flagg 1995: 31).

Health services can have an important influence on the local economy. In addition to the direct jobs they generate, they generate a high number of secondary jobs, relatively speaking. One study reported a multiplier effect in Oregon of 3.75 for every physician and physician employee, so a community with 20 medical personnel could generate an additional 75 jobs (Doeksen et.al. n.d.). By contrast, a grocery store employee has a multiplying effect of 1.33 effect in the Rogue Valley and a worker in a plywood mill worker in the Rogue Valley will generate an additional 2.84 jobs (personal communication, Mary Wright, Oregon Employment Department [OED])

Modem cowboys and "lone eagles" are terms in the literature referring to the growing number of entrepreneurs who make their living linked to the global marketplace and who are not dependent on the local economy. A key feature of this economic activity is that it involves the export of goods and services in some way. Hence, some artists sell only to a local tourism market, while others sell to national or international markets. Another feature is reliance on telecommunications. The use of computer modems and the internet have opened the doors to commercial activity for many that would have no outlet otherwise. The term, "modem cowboy," can be misleading too because transportation (UPS, airports) educational institutions and other telecommunications are important also. Socially and economically, modem cowboys are changing the face of the rural landscape. Economists are calling it "the declining disadvantage of distance." A University of Washington study found that they contributed 2600 jobs in a one-year period, and were responsible for 3% of the state's economy (Fossum 1996). Byers and his associates (1995) found that these entrepreneurs rated quality of life as extremely important, and ranked as relatively less important more traditional factors of labor and land costs, the tax base and so on. Byers et.al. estimate that modem cowboys contribute up to 17% of the rural counties that they analyzed.

Appendix O - Plant Species in CSEEA

This undocumented list was compiled by Frank Lang from a number of sources: Benoche (1999), Brock and Callagan (1999), Bradney (1999), Lang and others (1999a, 1999b), Lytjen and Otting (1999), Miller (1999), Wilson and others (1999), USDI-BLM (1999), USDI-BLM (1995) and personal observations (Lang). Nomenclature mostly follows Hickman (1993) and the NRCS Plant List for Oregon (NRCS 1999). The NRCS Plant List and some Sawyer and Keeler-Wolf (1995) recommendations are used for common names. To simplify and shorten common names the following conventions were adopted. Rather than -leaved and -flowered, -leaf and -flower are used. The possessive form ('s) for honorific names is not used, unless confusion would follow when spoken (Greene's mariposa lily rather than Greene mariposa Lily; is the lily green or Greene). We do not use the possessive for trees (Jeffrey pine) or for other plants (Howell false caraway). Hyphens are generally ignored.

Plants listed below may be widely distributed throughout the CSEEA planing area or maybe very local. The following symbols are used to indicate geographical areas in the CSEEA: cc = Cathedral Cliffs (Lower Camp Creek); cm = Chinkapin Mountain; hb = Hobart Bluff; jc = Jenny Creek; kc = Keene Creek area; lp = Lone Pine Ridge; lsr = Jenny Creek Late Successional Reserve; mu = Mariposa Unit, Pilot Rock ACEC; og = Oregon Gulch RNA; pbp = Parsnip Beaver Ponds; pdo = Porcupine/Dutch Oven Creek Ridge; plk = Parsnip Lakes; pr = Pilot Rock area; pru = Pilot Rock Unit, Pilot Rock ACEC; sc = Scotch Creek RNA; wsa = Soda Mountain Wilderness Study Area.

Native plants are indicated by italicized New Times Roman, alien plants by italicized Arial; noxious weeds by italicized and bold Arial scientific names.

Table AO-1. Plant Species in the CSEEA

Scientific Name	**Common Name**	**Place**
Aceraceae		
Acer circinatum	vine maple	kc
Acer glabrum	Rocky Mountain maple	kc, pr
Acer macrophyllum	bigleaf maple	sc, kc
Alismataceae		
Alisma gramineum [lanceolatum]	narrowleaf water plantain	plk
Anacardiaceae		
Rhus trilobata	skunkbush sumac	sc
Toxicodendron diversilobum	Pacific poison oak	sc
Apiaceae		
Angelica sp.		pbp
Anthriscus caucalis	burr chervil	sc
Cicuta douglasii	western water hemlock	plk
Daucus pusillus	American wild carrot	sc
Eryngium alismifolium	Modoc eryngo	kc
Heracleum maximum [lanatum]	common cow-parsnip	pbp, kc
Ligusticum apiifolium	celeryleaf licorice-root	sc
Lomatium californicum	California lomatium, Iknish	sc, kc
Lomatium dissectum	fernleaf biscuitroot	sc, og, kc
Lomatium macrocarpum	giantseed biscuitroot	sc, kc, pr, og
Lomatium nudicaule	barestem lomatium	sc, kc, og
Lomatium triternatum	nineleaf biscuitroot	og, kc
Lomatium utriculatum	common lomatium	sc, og, kc
Osmorhiza berteroi [chilensis]	sweetcicely	sc, kc
Osmorhiza occidentalis	western sweetroot	sc, kc
Perideridia gairdneri	Gairdner yampah	kc
Perideridia howellii	Howell false caraway, yampah	sc, og, kc
Perideridia oregana	squaw potato, Oregon yampah	sc, kc
Sanicula crassicaulis	Pacific blacksnakeroot	sc, kc
Sa nicula graveolens	northern sanicle	sc, kc
Torilis arvensis	spreading hedgeparsley	sc, kc
Yabea microcarpa	false carrot	sc, kc
Apocynaceae		
Apocynum androsaemifolium	spreading dogbane	sc, plk, kc, og
Aristolochiaceae		
Asarum hartwegii	Hartweg wildginger	kc
Asarum caudatum var viridiflorum [A.wagneri]	longtail wildginger	cm
Asclepiadaceae		
Asclepias speciosa	showy milkweed	kc, og
Asteraceae		
Achillea millefolium	common yarrow	sc, plk, og, kc
Adenocaulon bicolor	American trail plant	sc, kc, pr
Agoseris aurantiaca	orange agoseris	kc
Agoseris grandiflora	bigflower agoseris	sc, plk, kc
Agoseris heterophylla	annual agoseris	sc, og, kc
Agoseris retorsa	spearleaf agoseris	kc
Anaphalis margaritacea	western pearly everlasting	kc
Antennaria argentea	silver pussytoes	sc, kc
Arnica cordifolia	heartleaf arnica	og, kc
Arnica discoidea	rayless arnica	kc

Table AO-1. Plant Species in the CSEEA

Scientific Name	Common Name	Place
Arnica latifolia	broadleaf arnica	sc
Artemisia douglasiana	Douglas sagewort	sc, kc
Artemisia ludoviciana	white sagebrush	kc
Artemisia tridentata	big sagebrush	kc
Aster [Symphyotrichum] foliaceus	alpine leafybract aster	kc
Aster [Eurybia] radulinus	roughleaf aster	sc
Balsamorhiza deltoidea	deltoid balsamroot	sc, kc, og
Blepharipappus scaber	blepharipappus	sc, og, kc
Cacaliopsis nardosmia	silvercrown	sc
Centaurea solstitialis	yellow star-thistle	sc, kc, og
Chrysothamnus [Ericameria] nauseosus	rubber rabbitbrush	sc, og, kc, pr
Cichorium intybus	chicory	og
Cirsium arvense	Canada thistle	kc, og
Cirsium cymosum	peregrine thistle	sc, kc
Cirsium occidentale	cobwebby, snowy thistle	sc
Cirsium vulgare	bull thistle	sc, plk, pbp, kc
Conyza canadensis	Canadian horseweed	kc
Crepis bakeri	Baker hawksbeard	kc
Crepis capillaris	smooth hawksbeard	sc
Crepis monticola	mountain hawkweed	sc
Crepis occidentalis	largeflower hawksbeard	sc
Crocidium multicaule	common spring-gold	kc
Ericameria bloomeri	rabbitbrush goldenweed	kc
Erigeron compositus	cutleaf dasiy	sc
Erigeron eatonii	Eaton fleabane	kc
Erigeron foliosus	leafy daisy	sc
Erigeron inornatus	unadorned fleabane	sc
Erigeron philadelphicus	Philadelphia fleabane	sc
Eriophyllum lanatum	wooly sunflower	sc, plk, og, kc, pr
Gnaphalium palustre	western marsh cudweed	kc
Hieracium albiflorum	white hawkweed	sc, plk, kc
Hieracium cyanglossoides	houndstounge hawkweed	kc
Hieracium scouleri	Scouler's woolyweed	sc
Hypochaeris radicata	hairy catsear	kc
Lactuca serriola	prickly lettuce	sc, kc
Leucanthemum vulgare	oxeye daisy	kc
Madia citriodora	lemonscented madia	sc
Madia elegans	common madia	kc, og
Madia exigua	small tarweed	sc, kc
Madia glomerata	mountain tarweed	sc
Madia gracilis	grassy tarweed	sc, plk, kc
Micropus californicus	q tips, slender cottnweed	sc, kc
Microseris laciniata ssp. detlingii	Detling microseris	sc
Microseris mutans	nodding microseris	sc
Petasites frigidus	arctic sweet coltsfoot	kc
Rafinesquia californica	California plumbseed	sc
Rigiopappus leptocladus	wireweed, bristlehead	sc
Senecio integerrimus	lambstongue ragwort	sc, og, kc
Sonchus asper	spiny sowthistle	kc
Stephanomeria virgata	rod wirelettuce	sc
Taraxacum officinale	common dandelion	sc, og, kc

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Table AO-1. Plant Species in the CSEEA

Scientific Name	Common Name	Place
Tragopogon dubius	yellow salsify	sc, plk, kc
Tragopogon pratensis	jack-go-to-bed-at-noon	og
Uropappus lindleyi	silverpuffs	sc
Wyethia angustifolia	narrowleaf mule's ear	kc, og
Berberidaceae		
Achlys triphylla	sweet after death, vanillaleaf	kc
Berberis [Mahonia] aquifolium	hollyleaf barberry	og, kc
Berberis [Mahonia] nervosa	Cascade barberry	sc, kc
Berberis [Mahonia] piperiana	Piper barberry	sc, og
Berberis [Mahonia] repens	creeping barberry	og
Vancouveria hexandra	white insideout flower	sc, plk, kc

Table AO-1. Plant Species in the CSEEA

Scientific Name	Common Name	Place
Betulaceae		
Alnus rhombifolia	white alder	sc, kc
Alnus incana ssp. temuifolia	thinleaf alder	pbp
Corylus cornuta var. californica	California hazelnut	lsr, og
Boraginaceae		
Amsinckia menziesii var. intermedia	common fiddleneck	sc
Amsinckia menziesii var. menziesii	Menzies fiddleneck	kc
Cryptantha affinis	quill cryptantha	kc
Cryptantha intermedia	Clearwater cryptantha	sc, kc
Cryptantha torreyana	Torrey cryptantha	sc, kc
Cynoglossum grande	Pacific hound's tongue	sc, plk, og, kc
Lithospermum ruderale	western stoneseed, w. gromwell	kc
Myosotis discolor	changing forget-me-not	kc
Pectocarya pusilla	moth combseed	sc
Plagiobothrys cognatus [scouleri var. hispidulus]	sleeping popcornflower	sc
Plagiobothrys nothofulvus	rusty popcornflower	sc
Plagiobothrys stipitatus var. micranthus	stalked popcornflower	plk
Plagiobothrys tenellus	Pacific popcornflower	sc, kc
Brassicaceae		
Alyssum alyssoides	pale madwort	sc, kc, og
Arabidopsis thaliana	mouse-ear cress	sc
Arabis breweri	Brewer rockcress	sc
Arabis drummondii	Drummond rockcress	sc
Arabis glabra	tower rockcress	sc, kc
Arabis holboellii	Holboell rockcress	sc, kc
Arabis oregana	Oregon rockcress	sc
Arabis sparsiflora	sicklepod rockcress	kc
Athysanus pusillus	common sandweed	sc, og, kc
Barbarea orthoceras	American yellowrocket	kc
Cardamine nuttallii var. nuttallii	palmate toothwort	sc
Cardamine occidentalis	big western bittercress	pbp
Cardamine oligosperma	little western bittercress	sc, kc
Draba verna	spring draba, whitlowgrass	sc, og
Erysimum capitatum	sanddune wallflower	pr
Idahoa scapigera	oldstem idahoa, scalepod	kc
Isatis tinctoria	dyer's woad	wsa, or
Lepidium campestre	field pepperweed	plk, kc
Phoenicaulis cheiranthoides	wallflower phoeni., daggerpod	kc, pr
Rorripa curvisiliqua	curvepod yellowcress	sc, plk, kc
Thlaspi arvense	field pennycress	kc
Thysanocarpus curvipes	sand fringepod	sc, kc
Cactaceae		
Opuntia polycantha	plains prickly pear	cc
Campanulaceae		
Campanula [Asyneuma] prenanthoides	California harebell	plk, kc
Campanula scouleri	pale bellflower Scouler harebell	sc, plk, kc
Downingia sp.		kc
Githopsis specularioides	common bluecup	sc
Heterocodon rariflorum	rareflower heterocodon	sc, plk
Caprifoliaceae		

Table AO-1. Plant Species in the CSEEA

Scientific Name	Common Name	Place
Linnaea borealis	twinflower	kc
Lonicera ciliosa	orange honeysuckle	sc, plk, kc, pr
Lonicera hispidula	pink, hairy honeysuckle	sc, kc, og
Lonicera interrupta	chaparral honeysuckle	sc
Sambucus mexicana [nigra ssp. cerulea]	blue elderberry	sc, kc, pr
Symphoricarpos albus	common snowberry	sc, pbp, kc, pr, og
Symphoricarpos mollis	creeping snowberry	sc, plk, og, kc
Caryophyllaceae		
Arenaria serpyllifolia	thymeleaved sandwort	sc, kc
Cerastium fontanum ssp. vulgare	common mouse-ear chickweed	sc
Cerastium glomeratum	sticky chickweed	sc
Holosteum umbellatum	jagged chickweed	sc
Minuartia douglasii	Douglas stitchwort	sc
Moehringia macrophylla	bigleaf sandwort	sc, plk, og, kc
Pseudostellaria jamesiana	tuber starwort	sc, kc
Sagina saginoides	arctic pearlwort	sc
Silene campanulata	Red Mountain catchfly	kc
Stellaria media	common chickweed	sc
Stellaria nitens	shining chickweed	sc
Celastraceae		
Pachistima myrsinites	Oregon boxwood	sc, kc, pr
Convolvulaceae		
Calystegia occidentalis	chaparral false bindweed	sc, pr
Convolvulus arvensis	field bindweed	kc, og
Cornaceae		
Cornus glabrata	brown dogwood	sc
Cornus nuttallii	Pacific dogwood	kc
Cornus sericea ssp. sericea	redosier dogwood	sc, plk, kc
Crassulaceae		
Sedum obtusatum	Sierra, obtuse stonecrop	sc
Sedum stenopetalum	wormleaf stonecrop	sc, og, kc
Cucurbitaceae		
Marah oreganus	coastal manroot, wild cucumber	sc, og, kc, pr
Cupressaceae		
Calocedrus decurrens	incense cedar	sc, plk, og, kc
Juniperus occidentalis	western juniper	sc,og, pr, plk, kc
Cyperaceae		
Carex amplifolia	bigleaf sedge	pbp
Carex angustata	widefruit sedge	pdp
Carex aquatalis	water sedge	kc
Carex arcta	northern cluster sedge	plk
Carex athrostachya	slenderbeak sedge	plk
Carex aurea	golden sedge	sc, kc
Carex concinnoides	northwestern sedge	sc
Carex cusickii	Cusick sedge	plk, pbp
Carex deweyana ssp. leptopoda [C. leptopoda]	taperfruit shortscale sedge	sc, kc
Carex echinata	star sedge	sc
Carex feta	greensheath sedge	plk, pbp
Carex fracta	fragile sheath sedge	plk, pbp, kc
Carex geyeri	Geyer, elk sedge	kc
Carex hoodii	Hood sedge	plk, kc

Table AO-1. Plant Species [illegible] the CSEEA		
Scientific Name	**Common Name**	**Place**
Carex inops	long stolon sedge	kc
Carex interrupta	greenfruit sedge	plk
Carex livida	livid, pale sedge	pbp
Carex luzulina	woodrush sedge	pbp, kc
Carex microptera	smallwing sedge	plk
Carex multicaulis	manystem sedge	og
Carex pachystachya	chamisso, thickhead sedge	plk, pbp, og
Carex pellita	wooly sedge	plk, pbp
Carex praticola	meadow sedge	kc
Carex rossii	Ross sedge	plk, pbp, kc
Carex serratodens (unconfirmed)	twotooth, sawtooth sedge	sc
Carex stipata	awlfruit sedge	kc
Carex subfusca	brown, rusty sedge	plk, pbp
Carex utriculata [rostrata]	Northwest Territory, beaked sedge	pbp
Carex vesicaria	blister, inflated sedge	plk
Eleocharis acicularis var. acicularis	needle spikerush	plk, pbp, kc
Eleocharis macrostachya [palustris]	common spikerush	sc, plk, kc
Eleocharis obtusa	blunt spikerush	plk
Eleocharis palustris	common, creeping spikerush	plk
Scirpus microcarpus	smallfruit bulrush	plk, kc
Dennstaedtiaceae		
Pteridium aquilinum	bracken fern	plk, kc
Dipsacaceae		
Dipsacus fullonum	fuller's teasel	mu
Dryopteridaceae		
Athyrium filix-femina	common ladyfern	pdp, kc
Cystopteris fragilis	brittle bladderfern	sc, og, kc
Polystichum imbricans	narrowleaf, imbricate swordfern	sc
Polystichum munitum	western swordfern	sc, kc
Woodsia oregana	Oregon cliff fern	sc
Equisetaceae		
Equisetum arvense	field horsetail	pbp, kc, og
Equisetum hyemale	scouringrush horsetail	sc, kc
Ericaceae		
Arbutus menziesii	madrone	plk, kc, lsr
Arctostaphylos nevadensis	pinemat manzanita	kc
Arctostaphylos patula	greenleaf manzanita	sc, kc
Chimaphila menziesii	little prince's pine	sc, kc
Chimaphila umbellata	pipsissewa, common prince's pine	sc, kc
Hemitomes congestum	coneplant, gnome plant	pr
Pterospora andromedea	woodland pinedrops	kc, og
Pyrola dentata [P. picta]	toothed pyrola	kc
Pyrola picta	whitevein wintergreen	sc, kc
Pyrola picta var. aphylla	leafless pyrola	kc
Pyrola secunda [Orthilia]	side bells wintergreen	sc, pr
Euphorbiaceae		
Eremocarpus setigerus [Croton]	dove weed, turkey mullein	og
Euphorbia spathulata	warty spurge	kc
Fabaceae		

Table AO-1. Plant Species in the CSEEA

Scientific Name	**Common Name**	**Place**
Astragalus accidens ssp. hendersonii	Henderson milkvetch	sc
Astragalus californicus	California milkvetch	sc
Astragalus purshii var. tincta	Pursh milkvetch	sc
Lathyrus lanszwertii var. tracyi	thickleaf pea	sc
Lathyrus nevadensis	Nevada pea	sc, kc
Lathyrus polyphyllus	leafy peavine	sc, plk, kc
Lathyrus torreyi	Torrey peavine	plk
Lotus corniculatus	birdfoot deervetch	plk, kc
Lotus crassifolius	big deervetch	kc, pr
Lotus denticulatus	meadow lotus	sc
Lotus micranthus	smallflower deervetch	sc, kc
Lotus nevadensis	Nevada deervetch	sc, plk, kc
Lotus oblongifolius	streambank bird's-foot trefoil	pbp
Lotus pinnatus	meadow bird's-foot trefoil	sc, kc
Lotus unifoliatus [purshianus]	American bird's-foot trefoil	sc, plk, kc
Lupinus albicaulus	pine lupine	sc, kc
Lupinus albifrons	whiteleaf lupine	sc
Lupinus arbustus	spur lupine	sc
Lupinus bicolor	miniature lupine	sc, kc
Lupinus latifolius	broadleaf lupine	kc
Lupinus lepidus	dwarf lupine	kc
Lupinus leucophyllus	velvet lupine	kc
Lupinus polyphyllus	largeleaf lupine	kc
Melilotus officinalis	yellow sweetclover	pr
Trifolium albopurpureum	rancheria clover	sc
Trifolium ciliolatum	foothill clover	sc
Trifolium cyathiferum	cup clover	plk, kc
Trifolium dubium	suckling, little hop clover, shamrock	sc, plk, kc
Trifolium eriocephalum	woollyhead clover	kc
Trifolium macrocephalum	largehead clover	sc, kc
Trifolium microcephalum	smallhead, woolly clover	kc
Trifolium oliganthum	fewflower clover	kc
Trifolium pretense	red clover	kc
Trifolium repens	white clover	sc, kc
Trifolium variegatum	whitetip clover	sc, kc
Vicia americana	American vetch	sc, plk, kc
Fagaceae		
Chrysolepis chrysophylla	giant chinquapin	plk, kc
Quercus garryana	Garry oak, Oregon white oak	sc, kc, pr, eg
Quercus kelloggii	California black oak	sc, kc, eg

Table AO-1. Plant Species in the CSEEA

Scientific Name	Common Name	Place
Fumariaceae		
Dicentra uniflora	longhorn steer's head	pru
Dicentra formosa	Pacific bleeding heart	sc, kc
Garryaceae		
Garrya fremontii	bearbrush	og
Gentianaceae		
Swertia albicaulis [Frasera a.]	whitestem frasera	kc, pr
Geraniaceae		
Erodium cicutarium	redstem storksbill, filaree	sc, og, kc
Grossulariaceae		
Ribes binominatum	ground gooseberry	sc
Ribes inerme ssp. klamathense	Klamath gooseberry	sc
Ribes lacustre	prickly current	sc, kc
Ribes lobbii	gummy gooseberry	sc, kc, pr
Ribes roezlii	Serria gooseberry	kc
Ribes sanguineum	redflower current	sc, kc, og
Ribes velutinam	desert gooseberry	sc, pr
Haloragaceae		
Myriophyllum verticillatum	whorlleaf watermilfoil	plk
Hydrangeaceae		
Philadelphus lewisii	Lewis mockorange	sc, kc
Whipplea modesta	whipplevine	sc, kc
Hydrophyllaceae		
Hydrophyllum capitaum	ballhead waterleaf	kc
Hydrophyllum fendleri var. albifrons	Fendler waterleaf	sc
Hydrophyllum occidentale	California waterleaf	sc, pr
Nemophila parviflora	smallflower nemophila	sc, og, kc, pr
Nemophila pedunculata	meadow nemophila	sc, og, kc
Phacelia hastata	silverleaf phacelia	sc, pr
Phacelia heterophylla	varileaf phacelia	sc, og, kc
Phacelia linearis	narrowleaf phacelia	sc
Phacelia ramosissima var. eremophila	branched phacelia	sc
Hypericaceae		
Hypericum anagalloides	tinker's penny	sc, pbp, kc
Hypericum perforatum	Klamath weed	sc, plk, pbp, kc,og
Iridaceae		
Iris chrysophylla	yellow iris	sc, og, kc
Sisyrinchium bellum	western blue-eyed grass	kc, og
Sisyrinchium douglasii [Olsynium]	Douglas grass widow	kc
Sisyrinchium idahoensis	Idaho blue-eyed grass	kc
Juncaceae		
Juncus bolanderi	Bolander rush	plk, pbp
Juncus brachyphyllus	tuftedstem rush	plk, kc
Juncus bufonius	toad rush	kc
Juncus effusus var. gracilis	soft rush	plk, kc
Juncus effusus var. pacificus	Pacific rush	plk, pbp,og
Juncus ensifolius	swordleaf rush	plk, pbp, kc
Juncus hymienditus	Herman dwarf rush	kc
Juncus orthophyllus	straightleaf rush	pbp, kc
Juncu oxymeris	pointed rush	kc

Table AO-1. Plant Species in the CSEEA		
Scientific Name	**Common Name**	**Place**
Juncus tenuis	slender rush	plk, pbp, kc
Luzula campestris	field woodrush	sc, plk
Luzula comosa	common woodrush	kc
Lamiaceae		
Agastache urticifolia	nettleleaf horsemint	sc, pr
Mentha arvensis	wild mint	plk
Monardella glauca	pale, gray monardella	cm
Monardella odoratissima	mountain monardella,	sc, kc, pr
Prunella vulgaris	common self-heal, heal-all	og, plk
Satureja douglasii [*Clinopodium*]	yerba buena	sc, kc
Scutellaria angustifolia	narrowleaf skullcap	kc
Scutellaria antirrhinoides	nose, snapdragon skullcap	sc
Scutellaria siphocampyloides	skullcap	sc
Stachys ajugoides var. rigida [*S. rigida var. rigida*]	rough hedgenettle	sc, plk, pbp
Lemnaceae		
Lemna minor	common duckweed	plk, pbp, kc
Lemna minima	least duckweed	plk
Lemna trisulca	star, ivyleaf duckweed	plk
Spirodela polyrrhiza	common duckmeat, great d.weed	plk
Lentibulariaceae		
Utricularia vulgaris	common bladderwort	plk
Liliaceae		
Allium acuminatum	tapertip, Hooker onion	sc, kc
Allium amplectens	narrowleaf, paper onion	sc, kc
Allium siskiyouense	Siskiyou onion	hh, pdo
Allium tolmiei	Tolmie onion	kc
Brodiaea coronaria	harvest clusterlily	og
Calochortus greenei	Greene's mariposa lily	kc, pru, mu
Calochortus tolmiei	Tolmei cat's ear	og, kc
Camassia quamash	small, common camas	kc
Clintonia uniflora	one-flower clintonia, beadlily	kc
Dichelostemma capitatum	bluedicks	sc, kc
Dichelostemma congestum	ookow	kc
Dichelostemma multiflorum	roundtooth snakelily, wild hyacinth	sc
Disporum hookeri	drops-of-gold, Oregon fairybell	sc, kc, pr, og
Erythronium hendersonii	Henderson fawnlily	og
Erythronium klamathense	Klamath fawnlily	pk, sm
Fritillaria affinis	checker lily	sc, og
Fritillaria gentneri	Gentner fritillary	wsa
Fritillaria glauca	Siskiyou fritillary	
Fritillaria pudica	yellow fritillary, yellow bells	kc
Fritillaria recurva	scarlet fritillary	sc, og
Lilium columbianum	Columbia lily	kc
Lilium pardalinum ssp. vollmeri	Vollmer lily	sc
Lilium washingtonianum ssp. purpurascens	Washington lily	sc, kc, pr, og
Smilacina [*Maianthemum*] *racemosa*	feathery false lily of the valley	sc, plk, kc, pr
Smilacina [*Maianthemum*] *stellata*	starry false lily of the valley	sc, kc
Streptopus amplexifolius	claspleaf twistedstalk	sc, kc
Trillium albidum	giant white wakerobin	sc, pr

Table AO-1. Plant Species in the CSEEA		
Scientific Name	**Common Name**	**Place**
Trillium ovatum	Pacific trillium	sc, kc, pr
Triteleia hendersonii	Henderson triteleia	kc
Triteleia hyacinthina	white brodiaea	sc, plk, kc, og
Veratrum californicum	California false hellebore	kc, sm
Xerophyllum tenax	common beargrass	kc
Zigadenus venenosus	meadow death camas	kc, og
Limnanthaceae		
Floerkea proserpinacoides	false mermaidweed	pr
Limnanthes bellingeriana	Bellinger meadowfoam	og, kc
Linaceae		
Linum lewisii	prairie, Lewis flax	pr
Malvaceae		
Iliamna bakeri	Baker wild hollyhock, globemallow	kc
Sidalcea malviflora	dwarf checkerbloom, ch. mallow	plk, kc
Sidalcea oregana ssp. spicata	Oregon checkerbloom, ch. mallow	sc
Nymphaeaceae		
Nuphar leutea ssp. polysepala	yellow pond-lily	plk, pbp
Oleaceae		
Fraxinus latifolia	Oregon ash	plk, pbp, jc, kc, og
Onagraceae		
Circaea alpina	Enchanter's nightshade	sc, kc
Clarkia gracilis	slender clarkia	sc, kc
Clarkia purpurea ssp. quadrivulnera		sc
Clarkia rhomboidea	tongue clarkia	sc, kc
Gayophytum diffusum		kc
Epilobium [Chamerion] angustifolium	fireweed	kc
Epilobium brachycarpum	tall annual fireweed	sc, plk, kc
Epilobium ciliatum ssp. ciliatum	fringed willowherb	sc, pbp, kc
Epilobium densiflorum	dense flower willowherb	kc
Epilobium glaberrimum	glaucus willowherb	sc
Epilobium minutum	chaparral willowherb	sc, kc
Orchidaceae		
Calypso bulbosa	fairy slipper	sc, kc
Corallorhiza maculata	spotted coralroot	sc, plk, kc, pr
Corallorhiza striata	hooded coralroot	sc
Cypripedium fasciculatum	clustered lady's slipper	kc
Cypripedium montanum	mountain lady's slipper	sc, kc
Cephalanthera (Eburophyton) austinae	phantom orchid	sc, plk, kc, pr
Goodyera oblongifolia	rattlesnake plantain	sc, kc, og
Piperia transversa	royal rein orchid	sc
Piperia unalascensis	slender-spire rein orchid	kc
Platanthera leucostachys	Sierra bog orchid	pbp, kc
Orobanchaceae		
Orobanche uniflora	one-flower broomrape	sc
Paeoniaceae		
Paeonia brownii	western peony	kc
Papaveraceae		
Eschscholzia californica	California poppy	sc
Pinaceae		
Abies concolor	white fir	sc, plk, og, pr

Table AO-1. Plant Species in the CSEEA		
Scientific Name	**Common Name**	**Place**
Abies magnifica var. shastensis	Shasta red fir	pru
Pinus contorta	lodgepole pine	kc
Pinus lambertiana	sugar pine	og, kc
Pinus ponderosa	ponderosa pine	sc, og, kc
Pseudotsuga menziesii	Douglas-fir	sc, plk, og, kc
Plantaginaceae		
Plantago lanceolata	narrowleaf plantain	kc
Plantago major	broadleaf plantain	sc, plk, kc
Poaceae		
Achnatherum (Stipa) lemmonii	Lemmon needlegrass	sc, plk, kc
Agrostis capillaris	colonial bentgrass	kc
Agrostis exarata	spike bentgrass	plk, php
Agrostis scabra	rough bentgrass	plk
Aira caryophyllea	silver hairgrass	sc, kc
Alopecurus aequalis	shortawn foxtail	plk
Alopecurus geniculatus	water foxtail	plk, php
Alopecurus praterisis	meadow foxtail	kc
Arrhenatherum elatius	tall oatgrass	kc
Bromus carinatus	California brome	sc, plk, kc
Bromus diandrus	ripgut brome	sc
Bromus hordeaceus	soft brome	sc, kc
Bromus japonicus	Japanese brome	sc, kc
Bromus laevipes		kc
Bromus madritensis ssp. rubens	foxtail chess	sc
Bromus secalinus	chess	sc
Bromus sterilis	sterile brome	sc
Bromus tectorum	cheat grass	sc, og, kc
Bromus vulgaris	Columbia brome	sc, og
Calamagrostis canadensis	Canada reed grass	php
Cynosurus echinatus	hedgehog dogtail	sc, kc
Dacytlis glomeratus	orchard grass	kc
Danthonia californica	California oatgrass	plk, php, og, kc
Danthonia unispicata	one-spike oatgrass	kc
Deschampsia cespitosa	tufted hairgrass	kc
Deschampsia danthonoides	annual hairgrass	sc, kc
Deschampsia elongata	slender hairgrass	sc, plk, kc
Elymus elymoides	squirreltail	sc, kc
Elymus glaucus	blue wildrye	sc, plk, php, og, kc
Elytrigia intermedia	intermediate wheatgrass	sc, kc
Festuca arundinacea	tall fescue	og, kc
Festuca californica	California fescue	sc, og, kc
Festuca idahoensis	Idaho fescue	sc, kc, og
Festuca occidentalis	western fescue	sc, kc, og
Festuca pretensis	meadow fescue	kc
Festuca subulata	bearded fescue	kc
Glyceria elata	tall mannagrass	sc, plk, php, kc
Glyceria leptostachya	managrass	php
Hordeum brachyantherum ssp. californicum	meadow barley	sc, plk, php
Koeleria macrantha (cristata)	prairie junegrass	sc, kc
Melica harfordii	Harford oniongrass	sc
Melica spectabilis	purple oniongrass	kc

Table AO-1. Plant Species in the CSEEA		
Scientific Name	**Common Name**	**Place**
Melica subulata	Alaska oniongrass	sc, kc
Phleum pratense	timothy	plk, jc, kc, og
Poa bulbosa	bulbous bluegrass	sc, plk, og, kc
Poa compressa	Canada bluegrass	kc
Poa howellii	Howell bluegrass	sc
Poa palustris	fowl bluegrass	sc
Poa pratensis	Kentucky bluegrass	sc, kc
Poa secunda	one-sided bluegrass	sc, kc, og
Pseudoegneria spicata ssp. spicata	bluebunch wheatgrass	sc
Taeniatherum caput-medusae	medusahead	sc, og, kc
Torreyochloa pallida var. pauciflora	weak meadowgrass	plk, pbp
Trisetum canescens	tall trisetum	sc, kc
Trisetum spicatum	downy trisetum	plk
Vulpina bromoides	brome fescue	kc
Vulpia microstachys	Nuttall fescue	sc, og, kc
Vulpia myuros	rattail fescue	sc, kc
Polemoniaceae		
Collomia grandiflora	grand collomia	sc, plk, kc, og
Collomia heterophylla	variableleaf collomia	sc
Gilia capillaris	minature, smooth-leaf gilia	sc
Gilia capitata	bluehead gilia	sc, og, kc, pr
Ipomopsis aggregata	scarlet gilia	sc, pr
Linanthus bicolor	true babystars, bicolor linanthus	sc, kc
Linanthus bolanderi	Bolander linanthus	sc
Linanthus harknessii	Harkness linanthus	sc, plk, kc
Navarretia divaricata	divaricate, mountain navarretia	kc
Navarretia intertexta var. intertexta	needleleaf navarretia	plk, kc
Phlox adsurgens	northern, woodland phlox	kc
Phlox gracilis	slender, pink annual phlox	sc, kc
Phlox speciosa	showy phlox	kc, pr
Polemonium carneum	royal Jacob's ladder, salmon pol.	sc, pr
Polygonaceae		
Eriogonum elatum	tall wooly buckwheat	kc
Eriogonum nudum	barestem buckwheat	sc, kc
Eriogonum umbellatum	sulphur-flower buckwheat	sc, kc, pr, og
Eriogonum sphaerocephalum	rock buckwheat	pr
Polygonium arenastrum (aviculare)	oval-leaf, common knotweed	kc
Polygonum douglasii	Douglas knotweed	sc,kc
Polygonum polygaloides	milkwort knotweed	kc
Rumex acetosella	common sheep sorrel, sour dock	plk, kc
Rumex crispus	curly dock	plk, pbp, kc
Rumex salicifolia	willow dock	kc
Portulacaceae		
Claytonia [Montia] parviflora	littleleaf, smallflower miner's lettuce	sc, kc
Claytonia perfoliata	miner's lettuce	sc
Claytonia rubra ssp. rubra	redstem springbeauty	sc, og
Claytonia sibirica	Siberian springbeauty candy flowe	sc, kc, pr
Montia dichotoma	dwarf montia	kc
Montia fontana	annual water minerslettuce	kc
Montia linearis	narrowleaf minerslettuce	kc

Table AO-1. Plant Species in the CSEEA		
Scientific Name	**Common Name**	**Place**
Portulaca oleracea	little hogweed, common purslane	kc
Potomogetonaceae		
Potomogeton crispus	curly pondweed	jc
Potomogeton nutans	floating pondweed	plk
Primulaceae		
Dodecatheon sp.		kc
Trientalis latifolia [borealis var. latifolia]	starflower	og, kc, pr
Pteridaceae		
Cheilanthes gracillima	lace lipfern	sc, og
Pellaea brachyptera	Sierra cliffbrake	sc, og
Pentagramma [Pityrogramma] triangularis	goldback fern	sc
Ranunculaceae		
Aconitum columbianum	Columbia monkshood	kc
Actea rubra	red baneberry	kc, sm, pr
Anemone deltoidea	Columbian windflower	sc, kc, pr
Aquilegia formosa	western columbine	sc, kc, pr
Clematis ligusticifolia	western white clematis	sc
Delphinium menziesii	Menzies larkspur	kc, og
Delphinium nuttallianum	twolobe meadow, larkspur	sc
Isopyrum [Enemion] stipitatum	Siskiyou false rue anemone	sc, kc
Myosurus apetalus	bristly, least mousetail	kc
Ranunculus aquatilis var. hispidulus	whitewater crowfoot	plk, jc
Ranunculus flammula	greater creeping spearwort	plk
Ranunculus occidentalis	western buttercup	sc, og, kc
Ranunculus orthorhynchus	straightbreak buttercup	kc
Ranunculus repens	creeping buttercup	sc
Ranunculus uncinatus	woodland buttercup	sc, pbp, kc
Rhamnaceae		
Ceanothus cuneatus	buckbrush, wedgeleaf	sc, og, kc
Ceanothus integerrimus	deerbrush, wild lilac	sc, plk, og, kc, pr
Ceanothus prostratus	squaw carpet	plk, kc, og
Ceanothus sanguineus	redstem ceanothus	kc
Ceanothus velutinus	snowbrush	plk, kc
Rhamnus [Frangula] purshiana	cascara, Pursh buckthorne	sc
Rosaceae		
Amelanchier alnifolia	Saskatoon, western serviceberry	sc, plk, og, kc
Amelanchier utahensis	Utah serviceberry	sc
Aphanes occidentalis	western lady's mantle	sc, kc
Cercocarpus betuloides	birchleaf mountain-mahogany	sc, og, kc
Cercocarpus ledifolius	curlyleaf mountain-mahogany	sm, kc, hb, pdo
Crataegus douglasii	black hawthorn	sc, kc, og
Fragaria vesca	woodland strawberry	plk, og, kc
Fragaria virginiana	Virginia strawberry	kc
Geum macrophyllum	largeleaf avens	plk, pbp, kc
Holodiscus discolor	oceanspray	sc, kc, pr, og
Holodiscus microphyllus	dwarf oceanspray	sc
Horkelia congesta	Sierra, shaggy horkelia	kc
Horkelia daucifloia	carrotleaf horkelia	kc
Oemleria cerasiformis	Indian plum, osoberry	sc, kc
Physocarpus capitatus	Pacific ninebark	sc
Potentilla gracillis	slender cinquefoil	kc

Table AO-1. Plant Species in the CSEEA

Scientific Name	Common Name	Place
Potentilla glandulosa	sticky cinquefoil	sc, plk, kc
Prunus emarginata	bitter cherry	sc, kc
Prunus subcordata	Klamath plum	sc, og, kc
Prunus virginiana var. demissa	western chokecherry	sc, kc, og
Purshia tridentata	antelope bitterbrush	mu, og
Rosa californica	California wildrose	sc
Rosa gymnocarpa	dwarf, little wood rose	sc, plk, kc, og
Rosa cf. woodii	Wood's rose	plk
Rubus leucodermis	whitebark, blackcap raspberry	sc, kc
Rubus parviflorus	thimbleberry	sc, kc, og
Rubus ursinus	California, trailing blackberry	sc,kc
Sanguisorba minor	small, garden burnet	kc
Sanguisorba occidentalis	western burnet	plk, kc
Spiraea douglasii	Douglas spiraea	plk, kc, og
Rubiaceae		
Galium aparine	stickywilly, catchweed bedstraw	sc, og, kc
Galium bifolium	twinleaf, low mountain bedstraw	kc
Galium boreale	northern bedstraw	kc
Galium oreganum	Oregon bedstraw	kc
Galium parisiense	wall, small weedy bedstraw	sc
Galium porrigens	climbing bedstraw	kc
Galium trifidum	graceful, small bedstraw	kc
Galium triflorum	fragrant bedstraw	sc, kc
Salicaceae		
Populus balsamifera ssp. trichocarpa	black cottonwood	sc
Populus tremuloides	quaking aspen	plk
Salix exigua	narrowleaf willow	sc
Salix lasiolepis	arroyo willow	sc
Salix lucida ssp. lasiandra	Pacific, shining willow	sc, plk, kc
Salix scouleriana	Scouler willow	sc, plk, kc
Saxifragaceae		
Heuchera micrantha	crevice, small flower alumroot	sc, kc
Lithophragma affine	San Francisco woodland-star	sc
Lithophragma parviflorum	smallflower woodland-star	sc, kc, pr
Mitella diversifolia	angleleaf mitrewort	sc
Mitella trifida	threeparted, threetooth mitrewort	sc, kc, pr
Saxifraga ferruginea	russethair, rusty saxifrage	kc
Saxifraga integrifolia	wholeleaf, northwestern saxifrage	sc, kc
Tellima grandiflora	bigflower tellima, large fringecup	kc
Tolmiea menziesii	youth on age, pig-a-back plant	sc, kc
Scrophulariaceae		
Castilleja applegatei	wavyleaf Indian paintbrush	sc, kc
Castilleja [Orthocarpus] attenuata	attenuate Indian paintbrush	kc
Castilleja pruinosa	frosted Indian paintbrush	sc, kc
Castilleja [Orthocarpus] tenuis	hairy Indian paintbrush	kc, pr
Collinsia grandiflora	giant blue eyed Mary	pr
Collinsia linearis	narrowleaf blue eyed Mary	sc, kc
Collinsia parviflora	smallflower blue eyed Mary	sc, og, kc
Collinsia rattanii	sticky blue eyed Mary	sc, og
Mimulus alsinoides	wingstem monkeyflower	sc
Mimulus guttatus	seep, yellow monkeyflower	sc, pbp, kc, og

Table AO-1. Plant Species in the CSEEA

Scientific Name	Common Name	Place
Mimulus moschatus	muskflower	sc, plk, kc
Orthocarpus bracteosus	rosy owl's-clover	og
Pedicularis densiflora	Indian-warrior	kc
Pedicularis racemosa	sickletop lousew	kc
Penstemon deustus	scabland, hotrock penstemon	sc, og, kc, pr
Penstemon azureus var. *azureus* [*parvulus*]	azure penstemon	pr
Penstemon procerus	littleflower penstemon	kc
Penstemon roezlii	roezl, purple penstemon	sc, kc
Penstemon speciosus	showy penstemon	sc
Scrophularia lanceolata	lanceleaf figwort	sc
Synthyris reniformis	snowqueen, grouse flower	sc, plk, kc
Tonella tenella	smallflower tonella	sc, kc
Verbascum blatterae	moth mullein	kc
Verbascum thapsis	common, wooly mullein	plk, kc, og
Veronica americana	American brooklime, speedwell	php, kc
Veronica peregrina ssp. *xalapensis*	neckweed	sc
Veronica persica	birdeye, winter speedwell	sc
Veronica scutellata	skullcap speedwell	plk
Veronica serpyfolia	thymeleaf speedwell	kc
Selaginellaceae		
Selaginella wallacei	Wallace spikemoss	sc
Solanaceae		
Solanum parishii	Parish nightshade	sc, kc
Taxaceae		
Taxus brevifolia	western yew	kc
Typhaceae		
Sparganium emersum var emersum angustifolium]	narrowleaf, simple-stem burweed	plk, php
Typha latifolia	broadleaf cattail	plk., php, jc, kc, mu, og

Table AO-1. Plant Species in the CSEE.

Scientific Name	Common Name	Place
Valerianaceae		
Plectritis brachystemum [*congesta* ssp. *b.*]	shortspur seablush	sc
Plectritis congesta	shortspur seablush, rosy cornsalad	sc, kc
Valeriana sitchensis	Sitka valerian	pr
Valerianella locusta	Lewiston, European cornsalad	og, kc
Verbenaceae		
Verbena lasiostachys	western vervain	sc
Violaceae		
Viola douglasii	Douglas golden violet	kc
Viola glabella	pioneer, stream violet	sc, kc
Viola praemorsa	canary, Astoria violet	kc
Viola purpurea	goosefoot, purpletinged violet	kc
Viola sheltonii	Shelton violet	sc, og, kc
Viscaceae		
Arceuthobium abietinum	fir dwarf mistletoe	sc
Arceuthobium douglasii	Douglasfir dwarf mistletoe	sc
Arceuthobium campylopodium	western dwarf mistletoe	sc
Phorodendron densum	dense mistletoe	sc
Phorodendron libocedri	incense cedar mistletoe	sc
Phorodendron villosum	Pacific, oak mistletoe	sc
Vitaceae		
Vitis californica	California wild grape	sc

Appendix P - Butterflies Identified in the CSEEA

Table AP-1. Butterfly Species Recorded within the CSEEA (1999 Field Season)

	Scotch Creek RNA^	Oregon Gulch RNA^^	Pilot Rock ACEC	Soda Mountain Road	Porcupine Creek
HESPERIIDAE					
Epargyreus clarus californicus	X				X
Thorybes pylades*	X		X		
Erynnis icelus*					X
Erynnis propertius	X	X	X	X	X
Erynnis persius ssp.	X				
Pyrgus ruralis ruralis				X	
Carterocephalus palaemon mandan	X		X	X	X
Hesperia comma oregonia*		X	X		
Hesperia lindseyi	X	X	X	X	X
Polites mardon klamathensis*				X	
Polites sonora sonora	X	X		X	
Ochlodes sylvanoides sylvanoides	X	X	X	X	
Euphyes vestris vestris*		X			
Amblyscirtes vialis*	X	X			X
PAPILIONIDAE					
Parnassius clodius claudianus				X	
Parnassius smintheus sternitzkyi*	X		X		
Papilio zelicaon zelicaon		X	X	X	
Papilio rutulus rutulus	X	X	X	X	X
Papilio multicaudatus	X		X		X
Papilio eurymedon	X	X	X	X	X
PIERIDAE					
Neophasia menapia menapia	X	X			
Pieris sisymbrii sisymbrii			X	X	
Pieris occidentalis occidentalis				X	
Pieris napi castoria	X		X	X	
Pieris rapae			X		
Euchloe ausonides ausonides	X		X	X	
Anthocharis sara ssp.	X		X	X	
Anthocharis lanceolata	X		X	X	X
Colis philodice eriphyle			X		
Colias eurytheme	X	X	X	X	
Colias occidentalis chrysomelas		X		X	X
LYCAENIDAE					
Lycaena arota arota*	X				
Lycaena xanthoides xanthoides*		X		X	
Lycaena gorgon*	X	X	X		X
Lycaena heteronea heteronea	X		X	X	
Lycaena nivalis ssp.	X	X	X	X	X
Habrodais grunus lorquini*	X				
Satyrium californicum*	X	X			
Satyrium sylvinum putnami	X	X			
Satyrium tetra*	X	X			
Satyrium saepium saepium	X	X	X		
Mitoura grynea nelsoni	X	X	X	X	X

Table AP-1. Butterfly Species Recorded within the CSEEA (1999 Field Season)

	Scotch Creek RNA^	Oregon Gulch RNA^^	Pilot Rock ACEC	Soda Mountain Road	Porcupine Creek
LYCAENIDAE Cont.					
Incisalia augustinus iroides	X				
Incisalia eryphon eryphon	X	X			
Strymon melinus atrofasciatus	X				
Everes amyntula amyntula	X	X	X	X	
Celastrina argiolus echo	X	X	X	X	
Euphilotes battoides ssp.	X	X	X	X	
Euphilotes enoptes enoptes	X	X			
Plebejus idas ricei		X	X	X	
Plebejus saepiolus saepiolus		X	X	X	X
Plebejus icarioides icarioides	X	X	X	X	
Plebejus acmon amon/lutzi	X	X	X	X	
Plebejus lupini lupini	X	X	X	X	X
RIODINIDAE					
Apodemia mormo mormo*	X				
NYMPHALIDAE					
Speyeria zerene conchyliatus	X	X	X		
Speyeria callippe elaini	X	X	X	X	X
Speyeria hydaspe	X	X	X	X	
Boloria epithore chermocki	X	X	X	X	
Chlosyne palla palla	X	X	X		X
Phyciodes pratensis pratensis	X	X			X
Phyciodes mylitta mylitta	X	X	X	X	
Euphydryas chalcedona ssp.	X	X	X	X	X
Euphydryas editha rubicunda			X	X	
Polygonia satyrus	X				
Polygonia faunus rusticus		X			
Polygonia gracilis zephyrus	X	X	X	X	
Polygonia progne oreas*	X				
Nymphalis californica	X	X	X		
Nymphalis antiopa antiopa	X	X			
Nymphalis milberti milberti			X		
Vanessa virginiensis			X		
Junonia coenia		X			
Limenitis lorquini lorquini	X	X	X	X	X
Adelpha bredowii californica	X	X	X	X	
Coenonympha tullia eryngii	X	X	X	X	X
Cercyonis pegala ariane	X	X	X	X	
Cercyonis sthenele silvestris	X	X			
Cercyonis oetus oetus		X	X	X	
Oeneis nevadensis nevadensis*	X				
Danaus plexippus plexippus		X	X		
Number of Species:	60	50	50	43	23
Number of Visits; Man-hours:	7; 51.25	7; 32.25	7; 26.75	3; 16.75	1; 3.5
CSEEA Species Total: 81					
^ includes from access road to RNA					
^^ includes adjacent wet meadow					
* Unusual, Rare, or Noteworthy Species					

Appendix Q - Menke Report

Bureau of Land Management
Medford District, Ashland Resource Area
3040 Biddle Road
Medford, Oregon 97504
(541)770-2226

December 30, 1999

Contractor: John W. Menke 10935 Quartz Valley Road Fort Jones, California 96032 (530)468 5341

BLM Contract Reference Number HMROO-0 1 56

Rangeland Resource Evaluation and Basis for a Box-0 Management Plan

Under the constraints of 2 field days and 6 report preparation days, I have evaluated existing rangeland resource conditions, made predictions about future resource conditions under feasible livestock grazing and no grazing management alternatives, and made recommendations concerning a rangeland restoration program which can aid in the development of a revised Box-O management plan. I have included several references to past studies that have findings applicable to the Box-O Ranch. I have also given names of current researchers active in grassland restoration where noxious weed problems are paramount.

Given the thoughtfully organized contract specifications sent to me by BLM, I will prepare my material in the order of the outline provided except where out-of-order discussion aids in the integration of my report. In each case, I will give the specification followed by my prepared material. Although my field days were limited to the late fall period in an unusually dry year, necessary site and land condition trends were sufficiently observable. Historical photographs were made available to me to learn more about the previously heavily grazed condition of Jenny Creek riparian vegetation. It would be presumptuous of me to infer that I could develop a complete grazing management plan with what I know about the Box-O Ranch at this point, but I will give as much information as I can to help with the plan formulation:

1) Develop a grazing management plan for the Box-O Ranch that includes the following criteria:

A. Describe the existing plant communities and assess their current conditions:
    Community / Location
    Riparian areas
    Bottom land pastures
    Woodlands % with herbaceous understory

Riparian Areas

Two primary riparian areas were visited during the field trips, Jenny Creek and Oregon Gulch, although several of the ephemeral drainages were casually observed. Recognizing the management history of the Box-O Ranch with its Jenny Creek diversion, stream channelization, irrigated pasture development, intensive livestock grazing, recent absence of livestock grazing except for trespass, and most recent breaching of ditchbanks at most drainageways onto the floodplain, a lot of changes have, are, and will be taking place in the riparian zone associated with the creek.

The Jenny Creek streambank and within-stream vegetation is undergoing rapid secondary plant succession. Native woody and herbaceous plant propagules, including seeds, broken-off vegetative parts, root balls and other plant fragments containing living buds, are being delivered to the site by high stream flows, birds, mammals and humans. The plant diversity of the immediate riparian area is rapidly changing as more species arrive, competition among and between recently established species sort themselves out, and dominance relationships begin to establish themselves. A major increase in woody riparian vegetation has occurred compared to that following the heavy grazing period. To the casual observer, it would appear that stream function was on the way to rapid recovery.

This will not be the case because physical development of stream channel characteristics takes much more time than vegetation change and little has occurred in recent years.

The "Stream Channels and Floodplains on the Box-O Ranch section (pages 11 -16) of the Box-O Ranch Proposed Management Plan (BLM, 1997) does an excellent job of describing the hydrologic reasons for the existing condition of the Jenny Creek Riparian area on the Box-O. Rosgen's view that 'bedrock control' is still in effect on the creek and 'the flood-prone area stage will still overtop the berms', indicates that there is a possibility that greater stream sinuosity and meanders may develop without physical intervention. It is very important that the stream is limited in its downcutting potential. But without greater sinuosity and energy dissipation of floodwater, sediment will not be captured and rebuild the streambanks, floodplain and water table. Given the episodic effects of runoff from full reservoirs during rain-on-snow floods as infrequent as every 25-35 years, some of any future channel development may be lost 'over-night'. Existing conditions watershed-wide are not conducive for rapid recovery of a fully functioning Jenny Creek on the Box-O and the potential for changing these conditions is remote.

However, healthy and vigorous naturally regenerating willow, alder and young cottonwood along the stream is providing the right degree of bank protection to foster possible meander development. Experience indicates that more elaborate or resistant in-stream structures present greater flood-event risk than benefit (Professor John Buckhouse, Oregon State University, personal communication at Prineville Riparian Workshop). Concern about streamside vegetation diversity is really unwarranted at this successional stage because the willows and alders are fully sufficient to begin the process of physical stream channel recovery. It is quite likely that blowouts will continue to occur and take away large sections of streambank periodically. The right degree of streambank anchoring by relatively small-stemmed shrubs that can bend over yet stay rooted, coupled with sedges, rushes and grasses to stabilize sediment among the shrubs, is what is needed at this stage. These elements are present.

While the upstream reservoirs in the Jenny Creek watershed have reduced sediment input to the creek which is critically needed for bank building and floodplain development, more local sediment sources are likely from upland privately managed timberlands. Sediment is the 'currency' for rebuilding streambanks and floodplains (Wayne Elmore, Riparian Team, personal communication, Klamath Falls Riparian

Workshop) of Jenny Creek on the Box-O, so having sediment delivered over the next several decades is critical to a successful rebuilding process. Too often stream sediment is universally considered a bad thing.

I observed a lot of recruitment and very early stages of secondary succession along several segments of Oregon Gulch and other intermittent riparian areas indicating the potential of these areas to develop more complex and diverse riparian habitats. I also observed recent washouts on toe slopes of the uplands that likely occurred during the 'New Year's Day Storms' 3 years ago. Since Oregon Gulch is under consideration for Research Natural Area (RNA) status for its pine/Idaho fescue communities among other values, I will focus additional attention on this part of the Box-O Ranch.

Bottom Land Pastures

The previously irrigated pastures along Jenny Creek are now exhibiting 'old-field succession' or 'go-backland succession'. The improved pasture grasses that require periodic irrigation for their survival are being replaced by more drought tolerant, non-native species, such as invasive annual and perennial weeds and rhizomatous perennial grasses such as creeping bent grass (Agrostis stolonifera). While bent grass is not native, it is highly desired for its soil holding capacity and it produces excellent forage for big game and livestock. Since its growth form and appearance is similar to many native meadow grasses it does not detract from meadow aesthetics. Restoration to a natural state of assorted wet, mesic and dry meadow grasslands, which probably existed here, cannot be expected anytime soon. With improved hydrology from a more functional Jenny Creek, many of the attributes of the former ecosystem can develop. However, given the presence of aggressive weeds such as yellow star-thistle, medusahead, Canada thistle, chicory and many others that will arrive in the future, the 'bottom land pastures' left alone or only passively managed are a disaster in the making.

Only following meander, streambank, and floodplain redevelopment and a rising watertable will more wet meadows have a potential to redevelop. While full riparian system functionality may not occur without the stream reconstruction project suggested by Rosgen, I agree with the decision that this is too risky and too costly. There is too much existing potential to embark on such an effort at this time. My major point is that without restoration of weed resistant herbaceous communities on the bottomland pastures, existing and new noxious weed populations will spread onto the immediate streambanks and into the uplands. With current management limited to periodic burning and planting of woody riparian species, the bottom land pastures will serve as a vector for weeds to arrive and spread. It is also likely that dense stands of deep taprooted weeds such as yellow star thistle could transpire large quantities of water in summer. This could very likely reduce low-flow volumes in the creek in late summer and fall and threaten trout populations.

Woodlands with Herbaceous Understory

By contrast to the Jenny Creek riparian area and associated bottom lands, the upland oak, pine and fir woodlands and buckbrush (wedgeleaf ceanothus) and bitterbrush shrublands are in a higher and healthier condition. Late-seral stage bunchgrasses, Idaho fescue, pine bluegrass, bluebunch wheatgrass, California bromegrass, lemmon needlegrass, prairie junegrass, California oatgrass, western fescue, and California fescue, are in abundance. Indicators of rangeland health are low occurrences of weeds in woodlands and shrublands, except along roads and livestock driveways, presence of fully stocked grass stands with equal spaces between individuals on these relatively dry uplands and in the woodland understory, absence of low vigor bunchgrass plants with dead centers or pedestalled plants showing little or no history of severe sheet erosion, and a recognized matching of species to site conditions with expected shade tolerant species dominance in the understory and full-sun species in openings. Little yellow star-thistle invasion was observed in the uplands, and medusahead invasion appears limited to livestock driveways and roadways and previously farmed openings.

Old-fields of dryland grain crops or hay occur on some of the flatter uplands. Antique machinery was observed in one of the fields. These sites are weedy and medusahead poses the most significant off-site invasion threat. Littermats develop from medusahead litter because it is unpalatable to herbivores, is high in cell wall silica, and therefore natural decomposition is slow since microbes even have difficulty in recycling its litter. Medusahead reduces herbaceous community diversity by shading out emerging seedlings.

Excessive accumulations of needles, twigs and branches were observed in the pine forest understory in Oregon Gulch causing premature death of Idaho fescue among other native perennial grasses present. Pine needles have been shown to acidify soils and reduce grass palatability to herbivores. The pine litter accumulations indicate lack of natural fire regimes, and the niches made available due to dying Idaho fescue plants provide openings for weed invasion. Whether or not this area achieves RNA status, reintroduction of creeping, low intensity prescribed fire should be a high priority. This community type is probably the easiest to prescribe burn, since needle flammability provides a wide window of burning opportunity. Pine seedlings require nearly full sun and exposed mineral soil for successful establishment.

About an even distribution of vigorous and beginning-to-become decadent bitterbrush, buckbrush, and mahogany shrubs were observed on the field trips. Seedlings were not searched for but some were observed. Largely the shrub communities appeared healthier than many we have observed in the southern Oregon and northern California area on National Forest land. This may be a result of a more intensive livestock browsing history on the Box-O Ranch. Close but not excessive browsing by livestock or high deer use or both can serve as a surrogate to fire in keeping these three very palatable shrub species in a vigorous and healthy condition available to browsing animals.

A contractor was planting oak seedlings one of the days of our field trip. I observed that no augering or caging was being done, two necessary steps to successful oak seedling regeneration learned in California during the now 10-year plus, multimillion-dollar Integrated Hardwood Range Management Program. Without assistance in getting the tap root of oak seedlings below the layer of annual grass competition for water, and protection from browsing until young trees grow above the browse line (7 feet) of deer and livestock, little oak tree establishment can be expected from such artificial regeneration efforts. Dr. Doug McCreary, Natural Resources Extension Specialist at Browns Valley, CA is an excellent contact for this technology (ddmccreary@ucdavis.edu).

2) Describe and explain the potential / realistic use of grazing and / or prescribed fire, as a tool to meet ecological objectives for each community type. Explain the ecological implications of removing grazing entirely where it has historically occurred. In addition recommend alternatives to reducing or eliminating grazing. Address specific issues such as timing, intensity, and duration of grazing; pasture design and rotations; herd management, i.e. off-site water development, herding, salting; stocking rates and AUMs / area; ecological indicators of success / failure of the proposed grazing management system; and trade-offs and practicality of implementation. Develop recommended Best Management Practices (BMPs) for the community types / location i.e. riparian areas, uplands in relation to grazing management. Provide rationale for areas where grazing is not recommended.

Livestock grazing and prescribed fire have roles in meeting ecological objectives for bottom land pastures and uplands. Nature and natural succession, not human activity, will largely restore the immediate riparian vegetation community and possibly the physical stream function as described above for Jenny Creek. Prescribed livestock grazing on the bottom land pastures and uplands must be designed to minimize undesirable impacts to the riparian communities along Jenny Creek, Oregon Gulch and other intermediate, less well watered riparian areas in other gulches and draws. This is very possible.

Bottom Land Pastures

The bottom land pasture vegetation community needs to be reconstructed, which is a term restorationists use to indicate 'start from scratch'; there is little of the native meadow vegetation left to restore at present. The goal of the reconstruction project I will be outlining is to move toward a dominance of native herbaceous plants, grasses, grasslike plants and forbs. With a deeper than normal watertable due to the downcut Jenny Creek and lack of sinuosity, wet and mesic habitat requiring plants have a limited role to play until the floodplain becomes more functional and soil water becomes more available season-long. In the interim period that may be decades, summer dormant perennial bunchgrasses have a critical role to play in keeping noxious weeds under control and possibly eradicated depending on the budget, volunteer support, and availability of other labor. Some of the formerly seeded irrigated pasture species as well as remnant populations of native species will variably populate the future restored meadow vegetation.

Summer dormant perennial grasses are adapted to seasonally dry sites and are capable of surviving through periodic drought periods. They are in a unique class of plants suitable for restoration of these kinds of sites in the Mediterranean-type climate of southern Oregon. Their primary role is as a competitor with weeds for water, nutrients and light, being palatable yet not aggressive (some can be aggressive and those need to be avoided). Livestock grazing and prescribed fire, and possibly periodic haying of the bottom land pastures, will be needed to recycle the large amounts of aboveground biomass produced by the former irrigated pasture plants while the area is in transition to lower statured species. As summer dormant perennials replace these plants the vegetation largely can be managed by grazing alone with occasional burning. Over time additional native grasses, grasslike plants, and forbs can be added to create the natural patch diversity of meadows. Species will naturally sort themselves out depending on local site conditions. Much is being learned in restoration ecology today, and by the time the additional work is needed, new technologies will be available and should be used.

Summer dormant perennial grasses have been relatively well studied and local research has been done to screen possible candidate species for foothills in southern Oregon (Borman et al. 1990). Again, the purpose of seeding summer dormant grasses is to compete with weeds. While purist restorationists may advocate the exclusive use of natives, the high cost and low seedling vigor of most natives will limit practical choices. Native perennial grasses such as Lemmon needlegrass, California bromegrass and meadow barley have great potential for restoring these sites. On the majority of the area of dry bottom land the non-native grass Berber orchardgrass is a prime candidate restoration species which is relatively easy to establish, inexpensive and is adapted to the area (Borman et al. 1990). Lemmon needlegrass is one native summer dormant perennial grass worth additional experimentation on dry sites and could be grown in a mixture with Berber. Berber, being more vigorous and more palatable, could serve as a nurse plant for needlegrass. Needlegrass is likely longer-lived than Berber orchardgrass and its seedlings and young plants may benefit from Berber orchardgrass neighbors. Another needlegrass, purple needlegrass, was found to be highly responsive to livestock and prescribed fire management in central California (Menke 1992). California bromegrass and meadow barley (a commonly used nurse plant when seeded with other longer-lived species) are short-lived perennials requiring more mesic conditions (more shade or soil moisture, or both). They could be seeded, if necessary, on wetter sites such as below the drainageways on the bottom land pastures where several native and non-native species currently exist or in other mesic sites. Over time and with appropriate prescribed grazing and burning following seeding, longer-lived species such as needlegrass will likely increase in density on dry sites. Excellent contract propagation and seed production opportunities exist (Stone Nursery) allowing use of locally collected and adapted plant materials.

Some form of above ground biomass recycling (grazing, burning, and/or mowing) will need to be done to foster establishment and maintenance of summer dominant perennial grasses and maintain existing native plant populations in the bottom land pasture community during the transition from former irrigated pasture plants. Un-grazed annual production from the irrigated pasture plants (timothy, Kentucky bluegrass and tall fescue) currently create such dense shade that seeded plants could not survive. Burning at the end of the growing season does little to foster new plant establishment and provides open niches for weed invasion. Lodged litter and new growth in un grazed pasture shades out establishing seedlings of desired species thereby causing low vigor and premature death and turnover of plants.

Weed free grassland and meadows are normally made up of long-lived individual grass plants with well developed root systems resistant to weed colonization and competition. When grassland or meadow communities have rapid turnover of individuals, water and nutrient resources are underutilized and weeds colonize sites where 'free' resources are available. Small mammal populations increase dramatically in 'old-fields' where litter accumulations provide cover habitat. Associated burrow and mound disturbances provide weed colonization sites. Without recycling of annual production, especially in 'old-fields', noxious weed infestation is inevitable and uncontrollable. Good grazing management on these types of productive sites promotes the development of a continuous sod that is resistant to erosion and weed colonization and has excellent water infiltration.

Fire and grazing are natural processes that recycle grassland and meadow aboveground biomass. Mowing or haying is a further tool for recycling, and in a transitory period of reconstruction of the bottom land pastures, it should not be ruled out. Two values of haying are that some of the nutrient buildup due to previous management is removed with the hay if fed off-site, and haying can occur anytime during the growing season to allow regrowth of shaded plants. High nutrient availability in formerly intensively managed land is one of the causes of weed invasion in 'old-fields'.

Fire can and should be used in restoration of the bottom land pastures. It is a useful tool to remove standing dead litter and littermats and reduce the seedbank of weeds. However, using fire alone is problematic. At some point, if not from the beginning, native bunchgrasses will be part of the reconstruction program. Without control of the quantity of biomass prior to burning, fire intensity will often be too high and the heat will kill many native bunchgrass plants. While mowing and leaving the cut material on the ground may appear to be a reasonable alternative to grazing in preparation for a burn, too much will remain, creating hot spots and plant death. Livestock grazing is the most effective tool to control biomass during the grassland restoration process and maintain the grassland community into the future.

Another tool that should not be overlooked to eradicate yellow star-thistle is hand pulling, bagging and removal from the site. I highly recommend hand weeding. With members of society being required by law to give service to the community, there could hardly be a better use of their time than public land restoration. Likewise, prison and convict crews, in addition to volunteer organizations can be very effective. I would not propose this had my wife and I not used this method successfully to eradicate yellow starthistle from our own ranch in northern California. The acreage and infestation is not so great that such management is impossible. Timing is critical so as to remove plants prior to seed shatter. Three to five years minimum will be required depending on monitoring level to virtually get all plants. The 8-11 year seedbank one hears quoted for yellow starthistle is not as operative when in a mosaic of managed grassland.

The ecological implication of removing grazing entirely from the bottom land pasture reconstruction program is forgoing the most economical and effective tool the grassland restorationist has available. Under these site conditions of high productivity in a Mediterranean climate with high human traffic, the potential weed infestation problems are higher than for any other wildland vegetation condition. Weeds evolve with man and the Old World Mediterranean is where weeds have become most advanced since humans have lived there the longest. California and southern Oregon are unique in North America in that we share similar climates to the Old World and many of the noxious weeds are on the doorstep of the Box-O if not already present.

How can livestock grazing be coordinated with restoration to achieve the objectives for the bottom land pastures and not, at the same time, negatively impact the riparian and upland communities? Grazing should be imposed to get the greatest consumption of aboveground biomass in the shortest time, within reason. The purpose of grazing is to provide an open herbaceous canopy for regrowth of shorter statured natives in the matrix of the former irrigated pasture species and later in a matrix of summer dominant perennial grasses. I recommend interseeding (no till drill) summer dominant perennial grasses in fall following a hot fall burn to begin the reconstruction of the bottom land pastures. Additional seeding should be done periodically on areas needing additional plants and other species of grasses and forbs. The first growing season following the fall burn and seeding, grazing of cattle should begin in spring, most likely during May. The worst and most costly mistake made in grassland restoration when using interseeding in an existing grassland is to 'protect' the site from grazing the first year or so when, in fact, the negative effect of shading is most detrimental to young seedlings. If anything, grazing should be closest in the immediate 1-3 years after seeding.

The existing fence system surrounding the bottom land pastures (see special management for the southern most unit) can provide an excellent means to apply the proposed grazing management. Electric cross-fencing should be used to provide sub-pastures of a useful size and location to facilitate grazing. Five bottom land and two upland pastures have been previously described and mapped (BLM 1997) and their plan has much merit. Animals should be moved from one paddock to the next during May and June, possibly early July depending on plant growth rate and consumption rate. Adjustments in stocking and timing will need to be made depending on temperature, precipitation and plant growth. The object should be to utilize 50 to 60 percent of the large flush of spring growth of matrix plants such that cumulative regrowth will not shade out lower statured seedlings in the understory during summer. About 40-50% shade in the lower canopy is about right for seedling establishment.

In effect, time-controlled, short-duration grazing should be applied to the paddocks on a sequential basis for 6 weeks to 10 weeks total each year. As further discussed below, the grazing of the two upland pastures should be coordinated at the same time as that for the bottom land pastures. Having both limited grazing systems going in tandem provides for flexibility in adaptive management and for efficiency in livestock handling and grazing management. Grazing should occur on a rotation basis to keep grazing time per unit limited. The frequency would be one grazing period per paddock per year to begin with, with the possibility under the adaptive management scheme to briefly regraze the first-grazed paddock again each year to meet the reduced-shade objectives discussed above. The rotation order would be varied from year to year to achieve objectives for all the paddocks.

The main reasons for using short-duration grazing is to achieve more even utilization of plants, not allowing the animal to place undesirable grazing pressure on favored species, reduce the period of negative trampling and browsing impacts to woody plants and seeded plants, and to assure time for regrowth and recovery each year. Spring grazing is recommended because animals will maximize consumption when plants are most palatable, and therefore less time will be required to meet the biomass removal objective. Secondly, the propensity for cattle browsing of shrubs and riparian vegetation is lowest in spring when temperatures are cool, and the relative preference for browse compared to herbs is low (Loft et al. 1987). Animals tend to switch to willows and other riparian browse plants in summer and fall.

The southerly most bottom land pasture paddock contains soils and existing herbaceous vegetation very different than that for the other paddocks. In many ways it is more similar to many dry meadow uplands in southern Oregon, and its relatively flat topography lends itself to experimental trials. Much more of the unit is dry and with relatively shallow soils and therefore the aboveground biomass productivity is much lower. Restoration of this unit may actually turn out to be less difficult than for the other bottom land units. Great research opportunity exists in this unit for learning better how to restore grassland. Interseeding the shallow soil areas with native summer dormant perennial grasses initially may be the best option. Selective prescribed grazing using several seeding trials with different species and species mixes could be investigated here using temporary electric fencing.

Temporary electric fencing out of Jenny Creek and the pine plantings, coupled with off-site water development, could be considered for bottom land pasture restoration program discussed above, but it may work fine without such control and cost. Caging of pine seedlings is recommended to avoid trampling and browsing. Salting and herding management could further reduce impacts. A livestock manager will need to be present during the grazing period to assure success. Initial stocking rates can be calculated using previously collected plant biomass estimates, daily animal intake estimates based on average animal body size, the duration of the grazing period for each paddock, and the utilization necessary to achieve the biomass removal objective. I would suggest doing the grazing program one year prior to interseeding so that the bugs can be worked out without unnecessarily risking newly germinated seedlings. Since the bottom land paddocks vary in size and productivity, the length of the grazing period will vary and will need to be matched to the biomass removal standard. Sample clippings will be needed to gauge ocularly estimated removal and residual levels. Adaptive management adjustments will be necessary including possible alteration in size of paddocks done by moving the electric cross-fences. Off-stream water developments or limited stream access sites will need to be made available for livestock water if all within paddock segments of Jenny Creek are fenced out. My confidence in suggesting that fencing out of Jenny Creek should not be necessary is based on numerous successful examples of riparian restoration I have seen in operation where livestock grazing is limited to the cool part of the year when forage is lush.

Ecological indicators of success or failure of the proposed bottom land restoration program are many and complex. A budget, equal to or greater than that for implementing the burning, grazing, weed pulling, seeding, fencing, grazing management, etc. could easily be spent. The primary initial ecological indicator of success is noxious weed population decline and control. With livestock grazing limited to spring and early summer there will be little or no transport of noxious weed seed by livestock within or out of the bottom land pastures. By gross mapping of satellite populations of yellow star-thistle, initial hand pulling can be focused on potentially spreading satellite populations and individual plants most likely to lead to future spread. Using a limited sample of these weed populations and their control should be the first-line indicator that this primary noxious weed is coming under control. Repeated search and pulling (and counting) of new seedlings in those areas previously hand weeded should be the ecological indicator. The ecological indicator 'data' gathered for the project should be number of new seedlings pulled, bagged and removed from targeted areas. There is no need to have a separate monitoring team for this species; the weed pullers are the monitoring crew. The monitoring/pulling of yellow star-thistle must be done during summer prior to seed set, sometimes twice per summer depending on moisture availability. I suggest using this sole measure of weed eradication success/failure for the bottom land pastures for the first 3-5 years.

Since the ultimate mechanism for weed control maintenance is a plant community that is resistant to future weed invasion, the second-line ecological indicator of success or failure of the proposed bottom land restoration program should be monitoring of the establishing summer dormant perennial grass populations. While early indicators are sometimes useful to gather, only after about three to five years can the establishment success of interseeded perennials be assessed. It takes about this long for bunchgrasses in an existing grass sward to tiller and expand into a bunch growth form to the point that they can be monitored as small half-dollar to baseball-size tufted bunches of basal leaves. Since the method of establishment is drill seeding, monitoring methods involving linear searches along drill rows can facilitate efficient monitoring. During the 3-7 year time frame, monitoring of seedling establishment off the drill rows is an effective means of evaluating natural reseeding dynamics of the stand and should be used here. Both of these early stand evaluation procedures will involve count data to estimate density. In later years canopy cover of seeded species is the best measure of overall community composition and the role the seeded species are playing in the community. In that case a step-point or line point procedure is appropriate for grassland swards. Permanent transacts should be used for this repeated-measure statistic.

To determine if livestock are being managed effectively to keep undesirable impacts to Jenny Creek under control, streamside vegetation and bank condition should be monitored to determine ecological success/failure. If water access points are used it is likely that some impact monitoring of these areas will be required. Photo monitoring may be the most cost effective for both of these situations. More detailed and costly browsing-rate monitoring should be employed only if necessary, and use of exclosures will likely be necessary where different interpretations among professionals occur. Both parties in that case should do the monitoring together. More details on grazing system monitoring are given below in the section on monitoring.

The Record of Decision and Resource Management Plan of 1995 lists Best Management Practices (BMP) for livestock grazing with the objective: "To protect, maintain, or improve water quality, riparian-wetland areas and upland communities; to achieve properly functioning riparian ecosystems." Practices include: "Consider fencing springs, seeps, and water developments to protect water quality and riparian ecosystems; ensure rest for plant growth and vigor during the critical growing period; monitor, evaluate, and adjust livestock management practices to meet resource objectives; resolve management conflicts through development of grazing management plans; promote ecological recovery through appropriate forage utilization levels; and develop and implement recovery plans for riparian areas." While I have more to recommend below, I feel I have dealt with each of these practices in a valid and accarate manner and would challenge anyone who suggests that the riparian communities would be better protected in the long-term by elimination of livestock use on the Box-O Ranch riparian bottom land pastures and practice passive management given the threats that are imposed by further noxious weed invasion.

Woodlands with Herbaceous Understory Uplands

Prescribed grazing and prescribed fire have potential roles in meeting ecological objectives of the upland plant communities of the Box-O Ranch. Already discussed above, restoration of old-fields on flats in the uplands will require burning to remove medusahead thatch and reduce seed production and the seedbank of noxious weeds prior to seeding of native grasses and forbs. Interseeding of these old-fields in recommended. Short-duration grazing on the more productive parts of upland old-fields could be used as discussed above to aid in the establishment and maintenance of native grasses and forbs for the same reasons as presented for the bottom land pastures.

For the same reasons as presented for Jenny Creek, limited late-spring/early summer livestock grazing of uplands should not harm recovering riparian vegetation in Oregon Gulch and other upland riparian areas. Without livestock grazing buckbrush and bitterbrush shrubs will become decadent more rapidly and have reduced forage value for deer and elk. Litter buildup in ungrazed native perennial bunchgrasses will lead to lowered vigor, dead centers, reduced water use, higher rate of individual plant turnover, and therefore bunchgrass communities will become more susceptible to noxious weed invasion. Ungrazed uplands as a landscape will become more susceptible to fire ignition during summer and fall lightning events, and fire hazard will increase the ladder fuel connections from understory grasses to increasingly dense shrub stands to oak and conifer overstories. Following wildfire weed populations will become much more invasive and occupy more of the landscape. Forage value of previously ungrazed grasses will be less nutritious, and fall and winter deer, elk and other small mammal habitat values will be reduced compared to grazed habitat.

I recommend fencing out several key segments of Oregon Gulch to serve as comparison areas and for research purposes to determine potential vegetation structure without livestock grazing. The most important control on grazing is limiting it to late spring and early summer when water content of forage is high, running water is abundant, and tendency for browsing of riparian plants is lowest. Most would agree that the upland vegetation of this former ranch is in outstanding condition.. highly diverse and of nearly park-like status. Livestock grazing certainly had a role in its making, and with limited-season grazing, it should be used in a strategic way to demonstrate its potential in maintaining these ecosystems.

3) Describe the use and methods of grazing for the control of yellow star-thistle and other noxious weeds.

Since I focused or yellow star-thistle in my recommendations for management of the bottom land pastures, I have already done much of item C. However, there are a few points I have not made. First, most star-thistle infested communities in Mediterranean climates of southern Oregon and northern California cannot be managed to eradicate the weed with grazing alone (Thomsen et al. 1996). Intensive grazing alone in both irrigated and dryland pastures has not been successful in studies by Thomsen and others. Grazing or mowing at the wrong time, during early stages of bolting, can increase the number of stems, inflorescences and ultimate seed production if not follow-up grazed to consume those reproductive structures. More seed will be produced nearer the ground under these treatments making further treatment more difficult. Concern about the timing is not so critical if management is focused on hand removal.

Yellow star-thistle is a summer annual forb and therefore late spring rains and clay soils with their relatively high water holding capacity promote star-thistle growth and reproduction. Cracking-clays aid in the burial of seed and maintenance of the plant through its long-lived seedbank. The Box-O Ranch has well developed cracking clay soils and a growing population of yellow star-thistle. Recent research by Professor

Kevin Rice, Department of Agronomy and Range Science, Univ. of California, Davis 95616 has described the resource competition relationships that explain why yellow star-thistle is such an aggressive competitor. Application of his work agrees with my suggestions that the only way to eventually control the weed is to create a plant community which is resistant to invasion. That community is a stable perennial plant community that uses surface and subsurface water sources and defeats the competitive edge star-thistle has in its taproot system and prolific seed production.

In progress research by Drs. Joe DiTomaso and Dan Drake (Univ. Calif. Cooperative Extension, U.C. Davis and Siskivou County, respectively) near Yreka, California has shown great promise in interseeding perennial grasses, following treatment with the herbicide Transline to control and convert heavily infested stands of yellow star-thistle to perennial grasses. Intermediate wheatgrass was used in this work. I have not focused on these methods since use of herbicides on public land is problematic. They have not used intensive grazing as part of their program. Their site is considerably drier and initially had almost a complete dominance by star-thistle with no perennial grasses present. The site and researchers are available for a field tour and discussions.

4) Design the grazing management plan to use grazing as a tool to maximize forage for big game species (deer, elk) and minimize livestock/wildlife conflicts.

For similar reasons related to riparian vegetation conservation discussed above, I recommend a season and utilization limited late spring/early summer grazing program for the uplands of the Box O Ranch to maximize forage production for big game species. Using existing fencing, herding and salting livestock distribution practices to reduce undesirable livestock impacts as much as possible to riparian areas, I recommend a 35-40% utilization level on key species including late-seral perennial bunchgrasses based on growth accrued by the middle of July. This will result in a lighter annual use on these plants except in dry years when little additional growth can occur after the grazing season ends.

I recommend limited browse plant monitoring using a class-based degree of hedging measure while applying the bunchgrass utilization standard with the expectation that browsing rates will not be high. I recommend using paired plants of buckbrush, bitterbrush and willow inside and outside the Oregon Gulch livestock exclosures to partition browsing pressure of wild and domestic ungulates as much possible by keeping the fence low for deer and elk jumping over and the bottom wire un barbed and high enough for deer to pass under.

Food and cover requirements of deer and elk, resident or migratory, suggest that the Box-O Ranch provides some outstanding habitats. While both species seasonally use shrub and available tree canopy leaf and twig browses, oak acorn, leaf and lichen mast crops, they also use herbaceous plants when green and nutritious in spring and early summer. Elk, being more of a grazer than deer, consume grass forages to a larger ext t in winter than deer which use shrub browse and dry leaves off the ground when available in winter.

Livestock grazing can be used to increase food availability and increase food quality for deer and elk. I will present the material by lifeform of plant. Livestock grazing of herbs (grasses, grasslike plants and forbs) in grassland and meadow vegetation tends to shift community composition to a community with more forbs both seasonally and over years. Deer tend to prefer forbs to grasses although elk make extensive use of forbs as well. Many forbs are higher in protein and phosphorus than grasses, especially the clovers, medics and vetches. Forbs tend to be more digestible than grasses since their lignin content (a plant cell wall component) is lower. Forbs tend to shatter and cast their litter sooner in the late summer or fall than grasses so their seasonal availability is limited.

Grazing of grasses and grasslike plants causes them to regrow new leaves and stems. Young leaves are lower in lignin than older leaves and stems and therefore are more digestible, providing the grazer a more nutritious diet. Grass litter, while it can supply an energy source if other protein (nitrogen) sources are available, provides relative poor diets. Current year's standing dead grasses are better forage than last years grass litter due to leaching out of nutrients over time. Livestock grazing in spring or early summer when forages are abundant would not be competitive with deer or elk, and such activity would extend the higher quality of grassland and meadow vegetation forages longer into the season, especially important to migratory elk.

Buckbrush, bitterbrush, mahogany, oak and many other woody plant lifeforms provide foods and cover for deer and elk on the Box-O Ranch. All of these species produce plant material relatively high in digestibility, protein and energy content. Certain of the materials such as oak acorns have very high energy status, but little or no protein, and they contain tannins which can disrupt rumen function when consumed in too large amount over a short time. Rumen microflora in deer and elk are very capable of detoxifying such compounds if diet changes are not too abrupt. Livestock grazing in spring or early summer would focus grazing pressure on herbs although some browsing on woody plants would occur. Given the large abundance of woody plants on the uplands of the Box-O, competition between livestock and deer and elk would not be expected. Since acorns would fall each year after the end of the upland grazing period, competition for acorns between livestock and wildlife would not occur.

As stated above, livestock browsing on shrubs is likely responsible for an extended period of years of healthy growth and browse forage availability in many of these shrubs. Without natural fire regimes and with relatively low deer numbers, shrubs tend to reach post-mature decadent stages sooner than normal. The extra browsing pressure brought by livestock can extend the period of forage quality and keep upright growth in check to the benefit of smaller ungulates such as deer because of higher browse availability. Trampling of seeds fallen around buckbrush and bitterbrush plants are scarified by the physical action of hooves (deer and other ungulates) thereby increasing germination and seedling reproduction of these shrubs.

Willow shrubs are successional-stage plants in riparian areas, not late-seral plants as many misinterpret these communities. They are critically important first colonizers of point bars and other areas of recent disturbance. They play an important role in armoring gravel deposits and erosive banks, and provide excellent fawning cover in older stands as part of meadow vegetation. Leaves and twigs of willows are secondary forages for most ungulates including deer, elk and livestock in Mediterranean climates. That is, when abundant herbaceous and browse forages are available elsewhere on other species, and temperatures are not high as during summer when livestock may congregate in riparian areas, the tendency for browsing willow is low. Livestock and deer tend to 'switch' to willows in fall after a frost, apparently causing willow browse to become more palatable (Loft et al. 1987). Unfortunately, overbrowsing of willow vegetation has been common throughout western rangelands, probably due to a combination of 'hot-season' grazing, late-season grazing, and animal distribution problems on range allotments. Short-duration spring and early summer grazing should largely be benign to willow growth and reproduction.

Tree lifeforms are less available and therefore less utilized by livestock than herbs or shrubs. All ungulates together create the browseline we see on tree canopies especially oaks in this landscape, but no definitive work I am aware of has partitioned use among wild and domestic animals. An indirect effect of a well developed browse line is fire hazard reduction for spread from understory grasses and forbs into the oak canopy. Oak seedling depredation is likewise attributable to all the ungulates. Given the proposed late-spring/early summer grazing of the uplands coupled with the abundance of oak and other browse, the tendency for livestock to use oak seedlings is minimized.

5) Provide recommendations on grazing system monitoring and methods of measuring impacts/success of the grazing system in meeting the ecological objectives (improve/maintain riparian health, improve/increase forage for big game species, improve rangeland health/maintain current condition on areas currently meeting rangeland health standards) while being practical and economically feasible to implement. Describe how that information should be collected and utilized.

I have made several monitoring suggestions as part of my recommendations presented above. For the first three to five years I would recommend reliance on your resource specialists' judgments and a public committee to observe restoration/grazing activities and provide input. In applying the broad prescriptions I have presented, little risk exists for any of the resources of concern compared to the risk placed on them by continuing the passive, no action with limited burning alternative, which has been practiced since the property was acquired. I think my yellow star-thistle monitoring recommendation is straightforward and can be economically applied. Effectively, this monitoring is not an add-on task, but part of the eradication program. The photo monitoring of the livestock access points along Jenny Creek have proven acceptable to NMFS on Forest Service grazing allotments elsewhere in northern California and should be acceptable in this case as well. The late seral perennial bunchgrass utilization standard I have proposed for upland grazing is an accepted method for conserving such rangeland resources so long as the key areas selected for monitoring are representative of the uplands as a whole. Likewise, the browse plant monitoring, especially with the partitioning provision for wild and domestic ungulates using the Oregon Gulch livestock exclosures, is again the kind of reference area comparison sought by NMFS in such grazing programs. After the first five years the adaptive management adjustments should largely be in place and at that time additional monitoring of plant community composition should be added.

Many of the more quantitative criteria of rangeland health such as soil infiltration rates and riparian function are so intensive and variable that I would wait for additional technology developments before I invested in monitoring them. The Box-O Ranch was intensively managed for livestock for many years. With exclusion of management, weeds are exploding in the bottom land pastures and will threaten the riparian area further if left unchecked. As for the uplands, my grazing recommendations are quite conservative using both meanings of the word, resource conservation and cost effective.

In my recommendations above I have presented a combined grazing/restoration program for the Box-O Ranch to reduce or eliminate the potential further decline in rangeland health due to noxious weed invasion. This is the major threat to ecosystem function. With some creative implementation and a little flexibility in contracting, the proposed restoration effort will more than pay for itself in the long-term. Applications of findings, and learning from such an endeavor will be useful for the improved management of many other areas of public land.

Without a restoration program for the bottom land pastures along the lines presented above, little progress will be made toward a more functional riparian ecosystem including humans. Without control of the starthistle population, public recreation along Jenny Creek, among other values, will decline dramatically. Inputs to the stream from a healthy meadow adjacent to Jenny Creek will provide the water quality filter, the plant organic materials critical to instream invertebrates, the terrestrial insects for fish and amphibians, the shade, the extended flow periods from the longer lasting water table, and many other functions. Grazed uplands will provide improved forage resources for deer and elk and be less prone to wildfire and associated noxious weed invasion. Acquiring a property primarily for fish habitat improvement comes with a lot of additional responsibility given the current mission and standards of the Bureau of Land Management.

A key element in making such a proposed project work is having a cooperative, energetic and responsible permittee who will work with the BLM resource manager to implement controlled grazing systems. Using a Grazing Management Agreement rather than a long-term lease indicates to the permittee the proactive nature of the project and the expectations associated with adaptive management. Given the limited period of grazing proposed for the Box-O Ranch, a permittee who has nearby or adjacent grazing authority either by ownership of private land or a long-term lease would provide for more efficient grazing of this property. Having feasible options available makes for more successful adaptive management.

6) Describe the likely changes in bottomland vegetation as a result of eliminating irrigation.

The description was presented earlier.

7) *Provide literature cited for references used throughout.*

References

BLM. 1997. Box-O Ranch Proposed Management Plan, Draft Land Management Plan and Environmental Assessment for the Box-O Ranch. U.S. D. I., Bureau of Land Management, Medford District, Ashland Resource Area. 123 pp. and appendices.

Borman, M. M., D. E. Johnson, W. C. Krueger, and R. T. Mobley. 1990. Standing crop and population dynamics of selected species growing on southern Oregon foothill rangelands. Oregon State U. Range Field Day 1990, pages 58-83.

Loft, E. R., J. W. Menke, J. G. Kie, and R. C. Bertram. 1987. Influence of cattle stocking rate on the structural profile of deer hiding cover. J. Wildland. Manage. 51:655-664.

Menke, J. W. 1992. Grazing and fire management for native perennial grass restoration in California grasslands. Fremontia 20:22-25.

Thomsen, C. D., W. A. Williams, M. Vayssieres, C. E. Turner, and W. T. Lanini. 1996. Yellow Starthistle Biology and Control. Univ. Calif. Div. Agric. Nat. Res. Pub. 21541, Davis. 19 pp.

8) Identify data gaps and describe what further information should be obtained. Provide recommendations on research needs including the recommended experimental design and budget.

The primary data gaps are knowledge of adaptability of plants for restoration purposes and methods of handling the plant materials to facilitate restoration programs. I have suggested use of the southern most bottom land pasture paddock for riparian restoration studies and the Oregon Gulch area with a comparison area exclosure for studying potential natural plant communities. Small grants to serve as seed money are often effective to encourage cooperative projects. Linkage with local Cooperative Extension offices and Southern Oregon University is recommended.

Appendix R- Bureau's Guidelines for ACECs and RNAs

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.01 Purpose. This Manual Section provides policy and procedural guidance on the identification, evaluation and designation of areas of critical environmental concern (ACEC's) in the development, revision, and amendment of resource management plans (RMP's) and amendments of management framework plans not yet replaced by RMP's. It also clarifies the relationship of ACEC's to other designations and provides procedural guidance on the monitoring and management of ACEC's.

.02 Objectives. ACEC designations highlight areas where special management attention is needed to protect, and prevent irreparable damage to, important historic, cultural and scenic values, fish, or wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. The ACEC designation indicates to the public that the BLM recognizes that an area has significant valued and has established special management measures to protect those values. In addition designation also serves as a reminder that significant value(s) or resources exist which must be accommodated when future management actions and land use proposals are considered near or within an ACEC. Designation may also support a funding priority.

.03 Authority. The Federal Land Policy and Management Act (FLPMA) provides for ACEC designation and establishes national policy for the protection of public land areas of critical environmental concern. Section 202(c)(3) of the FLPMA mandates the agency to give priority to the designation and protection of ACEC's in the development and revision of land use plans. The BLM's planning regulations (43 CFR 1610.7-2) establish the process and procedural requirements for the designation of ACEC's in resource management plans and in plan amendments.

.04 Responsibilities. See BLM Manual Section 1601-04.

.05 References.

A. BLM Manual Section 1621.Designations of soil and water related ACEC's (Manual Section 1621.21) and scenic ACEC's (Manual Section 1621.41) are identified as possible determinations made in resource management planning supplemental program guidance for environmental resources.

B. BLM Manual Section 1622. Designation of a priority habitat ACEC is Identified as a possible determination made in resource management planning supplemental program guidance for renewable resources (Manual Section 1622.11).

C. BLM Manual Section 1623. Designation of a cultural resource ACEC is identified as a possible determination made in resource management planning (Manual Section 1623.1). Designations of research natural areas (RNA's), outstanding natural areas (ONA's), and natural hazard areas (NHA's) as ACEC's are identified as possible determinations made in resource management planning supplemental program guidance for land resources (Manual Section 1623-31).

.06 Policy. The FLPMA requires that priority shall be given to the designation and protection of ACEC's. The ACEC's are identified, evaluated, and designated through BLM's resource management planning process. An ACEC designation is the principal BLM designation for public lands where special management is required to protect important natural, cultural and scenic resources or to identify natural hazards. Therefore, BLM managers will give precedence to the identification, evaluation, and designation of areas which require 'special management attention during resource management planning. An ACEC designation will not be used as a substitute for wilderness suitability recommendations.

.1 Characteristics of ACEC's.

.11 Identification Criteria. To be considered as a potential ACEC and analyzed in resource management plan alternatives, an area must meet the criteria of relevance and importance, as established and defined in 43 CFR 1610.7-2.

A. Relevance. An area meets the "relevance" criterion if it contains one or more of the following:

- A. Significant historic cultural, or scenic value (Including but not limited to rare or sensitive archeological resources and religious or Cultural resources important to Native Americans).

- B. A fish and wildlife resource (including but not limited to habitat for endangered, sensitive or threatened species, or habitat essential for maintaining species diversity).

- C. A natural process or system (including but not limited to endangered, sensitive, or threatened plant species; rare, endemic, or relic plants or plant communities which are terrestrial, aquatic, or riparian; or rare geological features).

- D. Natural hazards (including but not limited to areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if It is determined through the resource management Planning process that it has become part of a natural process.

B. Importance. The value, resource, system, process, or hazard described above must have substantial significance and values in order to satisfy the 'importance' criteria. This generally means that the value, resource, system, process, or hazard is characterized by one or more of the following:

- A. Has more than locally significant qualities which give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource.
- B. Has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.
- C. Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA.
- D. Has qualities which warrant highlighting in order to satisfy public or

management concerns about safety and public welfare.

E. Poses a significant threat to human life and safety or to property.

.12 Special Management Attention. To be designated as an ACEC, an area must require special management attention to protect the important and relevant values. Therefore, areas which have important and relevant resource values and for which special management attention is prescribed are to be designated as ACEC's using the procedures set forth in this section. "Special management attention" refers to management prescriptions developed during preparation of an RMP or amendment, expressly to protect the important and relevant values of an area from the potential effects of actions permitted by the RMP, including proposed actions deemed to be in conformance with the terms, conditions, and decisions of the RMP. These are management measures which would not be necessary and prescribed if the critical and important features were not present. That is, they would not be prescribed in the absence of the designation. (In other words, the concept of special management is relative). A management prescription is considered to be special if it is unique to the area involved and includes terms and conditions specifically to protect the important and relevant value(s) occurring on that area. For example, a seasonal use stipulation on permits or other use authorizations may be prescribed specifically to protect an ACEC value. Special management attention also includes any plan provision intended to protect life and safety from natural hazards. Management prescriptions providing special management attention should include more detail than prescriptions for other areas and should establish priority for implementation. Special management often provides for consultation and coordination with identified groups and/or experts having interest or expertise in the affected values.

.2 Analysis and Designation Procedures . Designation of ACEC's are only done through the resource management planning process, either in the resource management plan itself or in a plan amendment. Procedural guidance on the nine resource management planning actions is set forth in BLM Manual Section 1616. Specific guidance on the identification, evaluation and designation of ACEC's in resource management planning is described below:

.21 Identifying Potential ACEC's. -All areas which meet the relevance and importance criteria must be identified as potential ACEC's and fully considered for designation and management in resource management planning. Potential ACEC's are identified as early as possible in the planning process. However, new information or evidence about the relevance and importance of resources or hazards may be submitted by the public or identified by the BLM at any time.

A. Compile A List of Areas To Be Considered. Areas to be considered in the identification of potential ACEC's include:

1. Existing ACEC's. Existing ACEC's are subject to reconsideration when plans are revised. Other existing designations must be reviewed, consistent with the standards of .53, to identify those which meet the relevance and importance criteria.

2. Areas recommended for ACEC consideration.

   a. External nomination. Members of the public or other agencies may dominate (i.e., recommend) an area for consideration as a potential ACEC. Such nomination/recommendation should be submitted early in the process, preferably during issue identification (BLM Manual Section 1616.1) and in comments on issues identified in the notice of intent (NOI), although they be submitted at any time. There are no formal or special procedures associated with nominations/recommendations submitted by the public or other agencies, i.e., there are no forms or other submission requirements for identifying potential ACEC'S (See .41 below).

b. Internal nominations. The BLM personnel are encouraged to recommend areas for consideration as a potential ACEC which appear to meet the relevance and importance criteria.

3. Areas identified through inventory and monitoring. An area may be identified for consideration as an ACEC at any time if, as a result of inventory and data gathering, there is evidence the area may meet the relevance and importance criteria (BLM Manual Section 1616.3).

4. Adjacent designations of other Federal and State agencies. Public lands adjacent to designations of other Federal and State agencies must be reviewed to determine if the special values upon which the adjacent designation was based extend into the planning area and meet the relevance and importance criteria.

B. Obtain Information and Data on Relevance and Importance. Information on relevance and importance will usually be obtained from inventory and data collection and in comments received in response to the NOI and the proposed planning criteria (BLM manual Section 1616.1, 1616.2 and 1616.3). Information on relevance add importance is actively sought during planning to aid the evaluation of potential ACEC areas.

1. Evidence of relevance and importance may be derived from non-BLM sources or from the judgement of specialists qualified by knowledge, training or experience to comment on the area or resource in question. Evidence of more-than-local significance of resource values or conditions include, but is not limited to, written comments and expert opinions from officials representing regional or national interests or inclusion of an area on an official state, regional, national or international listing.

2. Non-BLM sources of information include, but are not limited to, other Federal agencies; State or local governments; international organizations or programs; State historic or natural heritage programs; universities and other research institutions; conservation organizations and public interest groups. Information about resources on adjacent non public lands may also be needed for evaluating the relevance and importance of resource values or hazards on public lands.

C. Evaluate Each Resource or Hazard to Determine if it Meets Both the Relevance and Importance Criteria. This initial evaluation is accomplished by an interdisciplinary team as part of the analysis of the management situation during the resource management planning process (BLM Manual Section 1616.4). The Area Manager, with District Manager concurrence, approves the relevance and importance evaluations. An area meeting the criteria is identified as a potential ACEC appropriate for further evaluation in the RMP process and perhaps temporary management. Normally, the relevance and importance of resource or hazards associated with an existing ACEC are reevaluated only when new information or changed circumstances or the results of monitoring establish the need.

D. Areas Dropped From Further Consideration For ACEC Designation. When an area is found not to meet the relevance and importance criteria, the analysis supporting that conclusion must be incorporated into the plan and associated environmental document. The management prescriptions which are eventually established in the plan for such areas shall reflect consideration of the identified values. The public may comment on the management prescriptions for areas dropped from further consideration when the draft RMP or plan amendment is released for review and comment (1613.23B.1). If an area is being evaluated as a result of a public nomination and it is determined that the area should not be considered further, the nominator should be notified that the area does not meet the required criteria.

E. Provide Temporary Management of Potential ACEC, if Necessary. If an area is identified for consideration as an ACEC and a planning effort is not underway or imminent, the District Manager or Area Manager must make a preliminary evaluation on a timely basis to determine if the relevance add importance criteria are met. If so, the District manager must initiate either a plan amendment to further evaluate the potential ACEC or provide temporary management until an evaluation is completed through resource management Planning. Temporary management includes those reasonable measures necessary to protect human life and safety or significant resource values from degradation until the area is fully evaluated through the resource management planning process.

.22 Develop Management Prescriptions for Potential ACEC'S. Management prescriptions must be developed for all potential ACEC's. At least one prescription for each potential ACEC must be developed which provides special management attention.

A. Identify Factors Which Influence Management Prescriptions. These factors will vary based on the planning issues and resources in the planning area. They are primarily identified and evaluated during the analysis of the management situation (BLM Manual Section 1616.4). These factors are important in the development of management prescriptions for potential ACEC'S. Factors to consider include, but are not limited to, the following:

1. Conditions or trends of the potential ACEC. What is the current condition of the resources or hazard involved? What is the trend in its condition? Can degradation be stopped? Is it reversible? What is the capability of the resource or hazard in terms of the level and type of use it can sustain without risk or threat?

2. Relationship to other resources or activities. What measures can be taken to reduce the adverse effects of other resource uses on the potential ACEC? Are resource uses contributing to the degradation of or threatening the existence of the important and relevant values? What land and resource uses would be compatible and under what conditions should they be conducted or permitted in order to protect the relevant and Important values? What uses or actions would not be compatible with protection of the identified values even when conditioned Considering the objectives of the RMP alternative, do the values of other resources outweigh the need for protection of the important and relevant values?

3. Opportunities for protection and/or restoration of potential ACEC values. What measures can be taken to protect the potential ACEC value(s) without restricting other resource uses? Is it feasible to protect the resource value(s) or reduce of minimize threats from hazards?

4. Wisdom of highlighting the resource. In it wise to highlight the potential ACEC? Will highlighting achieve some management objective or enhance the area's value? Or will increased public awareness of the area accelerate its degradation?

5. Boundary Review. The boundary of a prospective ACEC is closely reviewed. This review examines surrounding or adjacent public lands and considers likely management requirements and their feasibility. Appropriate

adjustments are identified. When a prospective ACEC is located in close proximity to another prospective ACEC consideration is given to consolidation during boundary review. In some situations a combination of different kinds of prospective ACEC values may add to the importance of the area as a whole and influence boundary locations.

6. Relationship to non-BLM designations. Is the potential ACEC included in an area recommended for designation (or already designated), e.g., a Wild and Scenic River? Will (or does) management under the other designation afford sufficient protection of potential ACEC values?

7. Opportunities for management by another agency. Are there, in terms of the public interest, any other public agencies or private organizations that could manage the resource value(s) associated with the potential ACEC more effectively than the BLM ? Is it appropriate to consider the transfer of the potential ACEC to a another Federal, State or local agency?

8. Relationship to existing rights. What is the status of existing mining claims or pre FLPMA leases? How will existing rights affect management of the resource or hazard?

B. Incorporate Management Prescriptions for Potential ACEC into Appropriate Alternatives. During the formulation of alternatives, management prescriptions for potential ACEC's are fully developed (BLM Manual Section 1616.5). Management prescriptions will generally vary across the plan alternatives. If there is no controversy or issue raised regarding the management of a potential ACEC, it may not be necessary to develop a range of management alternatives. In other words, the management prescription may not vary significantly across alternatives. A potential ACEC (or portion thereof) must be shown as recommended for designation in any or all alternatives in the draft RMP in which special management attention is prescribed to protect the resource or to minimize hazard to human life and safety. Because special management attention must be prescribed in at least one plan alternative, each potential ACEC will appear as a recommended ACEC in at least one plan alternative. When the designation and special management provisions of an existing ACEC are compatible without change in all alternatives, the procedures set forth in Manual Section 1618.22 Restatement of Decisions must be followed. If, however, there are issues associated with the management of the potential ACEC, the alternatives analyzed in detail shall reflect a reasonable range of management prescriptions for the potential ACEC. Management prescriptions may vary in a number of ways.

1. Degree or intensity of management attention. The management prescription for a potential ACEC may vary across the alternatives from no special management attention to intensive special management attention. Variations in management measures may reflect different mixes of allowable uses in or adjacent to the potential ACEC or constraints on uses. Situations in which no special management attention would by prescribed (and therefore no designation include those in which the allowable uses being prescribed for the vicinity could not result in harmful effects to the important and relevant resource values and those in which the alternative would necessitate the sacrifice of the potential ACEC values to achieve other purposes.

2. Size of area to receive special management attention. In some cases, boundaries may be varied to provide more or less protection of the resource or to accommodate different management prescriptions. The size of a proposed ACEC shall be as necessary to protect life and safety or the important and relevant values within the context of the set of management prescriptions for

public lands in the vicinity which would be established by each RMP alternative.

3. Term of special management attention. Usually, ACEC's are designated for the life of the RMP. However, it may be appropriate for the ACEC to be established for a shorter period of time. Such a short-term ACEC would be appropriate when conditions and circumstances justifying the special management are expected to be temporary. In such instances, the management prescription for the ACEC must contain a clear description of the conditions under which the ACEC designation will expire and the change in management prescriptions which will apply. No subsequent public notice of the expiration is required if the original public notice adequately described the term and nature of conditions.

C. Analyzing Effects of the Prescriptions. Designation of an ACEC will not produce effects which can be analyzed. However, the management prescription for the ACEC (i.e. the special management attention) will result in effects. Experience has shown that controversy over proposed ACEC designation is often based on differing perceptions of the anticipated effects of that designation. Therefore, the likelihood of controversy can be reduced by conducting a thorough and well-documented estimation of effects analysis.

.23 Designating ACEC'S. Designation is based on whether or not a potential ACEC requires special management attention in the selected plan alternative.

A. Select Preferred Alternative. After completing the analysis of the effects of each alternative (BLM-Manual Section 1616.6), the manager selects the preferred plan alternative which best meets the planning criteria and the guidance applicable to the area (BLM Manual Section 1616.7). The preferred alternative reflects the BLM's proposals for designation and management of ACEC's.

B. Review Public Comments an Proposed ACEC Designations and Management Prescriptions. Public review of ACEC designations and management prescriptions must be accomplished in accordance with BLM Manual Section 1616.7 and 1616.8 and 43 CPR 1610.7-2. Public notice requirements for RMP's and plan amendments involving potential or proposed ACEC's are set forth at .33 below. The public may comment on any aspect of the ACEC analysis including the relevance and importance evaluation, the projected need for special management attention, and the analysis of impacts of allowable resource uses on the values of proposed ACEC's as well as the impact of ACEC management prescriptions or limitations on other resource uses. The BLM reviews public comments and makes changes as necessary. The BLM then notifies the public of the availability of the proposed RMP or plan amendment and the environmental analysis associated with each.

C. Approve ACEC Designation. Approval, by the State Director, of the proposed plan or plan amendment officially designates ACEC's (43 CPR 1610.7-2).

.3 Public Notice and ACEC Documentation Standards.

.31 Notice of intent. Guidelines on the general notice required at the outset of the planning process inviting public participation are set forth in BLM Manual Section 1614.3. Areas identified during pre-planning for consideration as an ACEC, if any, must be described in the NOI. Any anticipated issues related to the consideration of ACEC's should be described too. Existing ACEC's and related designations particularly if they are associated with any preliminary issues, shall also be identified in the NOI so that the public has an opportunity to participate in their reevaluation. The NOI should invite the public to nominate or recommend areas for ACEC consideration.

.32 Special Notice Requirement for Plans Involving ACEC's. The planning regulations require special notice in the Federal Register for RMP's or plan amendments involving proposed ACEC's (43 CFR 1610.7-2). The notice must provide for at least a 60-day public comment period. The notice must describe proposed ACEC's included in the BLM's preferred alternative and specify resource use limitations, if any, which would occur. The notice should also identify potential ACEC's (those areas which satisfy the relevance and importance criteria) which are not proposed for ACEC designation in the preferred alternative. For RMP's and EIS level plan amendments, the notice is issued by the BLM when the draft RMP or plan amendment is published and the associated EIS is filed with the Environmental Protection Agency (EPA) and made available for public comment. The ACEC notice requirements should be incorporated in a notice of availability when the BLM elects to publish its own notice. For environmental assessment level plan amendments, the notice is published sufficiently early enough to afford the public timely notice and opportunity for meaningful input and involvement in the analysis and evaluation.

.33 RMP or Plan Amendment. Proposed ACEC's and their associated management prescriptions must be identified and fully described in proposed RMP's and plan amendments released for public review. Management activities associated with an ACEC are usually described in greater detail than resource management activities not associated with an ACEC. General guidance on the display and presentation of planning determinations as multiple use prescriptions and plan elements are set forth in BLM Manual Section 1602.23. For each proposed ACEC, the plan or plan amendment shall contain:

A. Name, Location, and Size of ACEC. ACEC's should be given a name. The name given an ACEC is usually based on the resource or value determined to warrant special management or on a particular physical feature of an area. In order to provide more specific management guidance and/or to retain the relationship with Federal or State heritage programs, existing names or titles should be incorporated into the name of the ACEC, i.e., the terms research natural area, outstanding natural area, natural hazard area, or other formal or established titles should normally be a part of the ACEC name. This will provide consistency and enhance recognition and understanding by the public (e.g., Salmon Spawning Research Natural Area ACEC, Palomino Landslide ACEC, Grand Mesa National Natural Landmark ACEC). The RMP or plan amendment must describe the proposed boundaries of the ACEC including the total acreage for each alternative studied in detail. The boundaries of each ACEC should be delineated as clearly as possible on a map included in the plan.

B. Description of the Value, Resource, System, or Hazard. The value, resource, system, or hazard which warrants special management attention under the ACEC provisions must be described. This description should clearly indicate why the area is considered relevant and important.

C. Provision for Special Management Attention. Management activities and anticipated future uses considered compatible with the purposes of an ACEC designation, and those considered incompatible, must be described as part of the multiple use prescription developed for each alternative studied in detail (BLM Manual Section 1602.23A). Key planning and management information unique to the ACEC, including proposed special management terms and conditions, must be described as an ACEC element in the plan (draft or proposed) whenever an ACEC is proposed for designation (BLM Manual Section 1602.23B). "Special" actions which must be taken after approval of the RMP must be described, such as acquiring inholding and access, setting up an interpretive center, withdrawing an area from mineral entry, establishing special stipulations to be attached to authorizing actions, or conducting more detailed activity planing. Given the level of public interest in specific ACEC's, it may be desirable to prepare a brochure for each ACEC, based on the plan element, which contains the following Information: description of the ACEC including values; location map; summary of the applicable RMP provisions; summary of measures to be initiated by the BLM with estimated costs and priority of implementation; other measures to be carried out; and the standards and intervals for monitoring in accordance with the provisions of 43 CFR, 1610.4-9.

D. Relation to Wilderness Study Areas. ACEC's may be designated within wilderness areas. ACEC designation shall not to be used as a substitute for a wilderness suitability recommendation. If an ACEC is proposed within or adjacent to a Wilderness Study Area (WSA), the RMP or plan amendment shall provide a clear description of the relationship of the ACEC to the recommendations being made for the WSA. The relationship shall be described to the level of detail required to avoid misunderstanding or misinterpretation by the public.

E. Rationale for Designating or Not Designating. The rationale for ACEC designations in the preferred alternative must be discussed. The rationale for not proposing designation of a potential ACEC in the preferred alternative must also be provided. In other words, if the proposed plan does not call for special management attention of a potential ACEC in the preferred alternative (and therefore, it is not proposed for designation), the reasons for the decision not to provide special management attention must be clearly set forth. The reasons may include:

1. Special management attention is not required to protect the potential ACEC because standard or routine management prescriptions are sufficient to protect the resource or value from risks or threats of potential ACEC because standard or routine management prescriptions are sufficient to protect the resource or value from risks or threats of damage / degradation. (That is, the same management prescriptions would have been provided for the area in the absence of the important and relevant values.)

2. The area is being proposed for designation under another statutory authority, e.g., Wilderness, and requires no management attention differing from that afforded the entire designation.

3. The manager has concluded that no special management attention is justified either because exposure to risks of damage or threats to safety is greater if the area is designated or there are no reasonable special management actions which can be taken to protect the resource from irreparable damage or to restore it to a viable condition.

F. Areas Dropped From Consideration For ACEC Designation. Areas which were nominated or recommended for consideration as an ACEC but which did not qualify as relevant and important must be identified and the rationale for not considering them described (1613.21D).

4. Opportunities for Public Involvement. Public involvement is important in the identification, evaluation, and designation of an ACEC. The following guidance highlights some of the opportunities for public involvement.

4.1 Nomination of Potential ACEC's. The public has an opportunity to submit nominations or recommendations for areas to be considered for ACEC designation. Such recommendations are actively solicited at the beginning of a planning effort. However, nominations may be made at any time and must receive a preliminary evaluation to determine if they meet the relevance and importance criteria and, therefore, warrant further consideration in the planning process. The public should be advised that nominations should be accompanied by descriptive materials, maps, and evidence of the relevance and importance of the resources or hazards in order to facilitate a timely evaluation.

.42 Comment on Analysis of Potential ACEC's. The public has an opportunity to comment on BLM's assessment of relevance and importance criteria as well as alternative management prescriptions for ACEC's (and supporting analyses) when the draft RMP or plan amendment is made available for public review. The public may also comment on areas the BLM has determined do not meet the criteria. The public should be encouraged to focus their comments on the proposed management of the area rather than on whether or not the area is proposed for designation.

.43 Protest of Proposed ACEC Designations. The public has an opportunity to protest ACEC designations and management prescriptions identified in a proposed RMP or plan amendment. (See protest procedures set forth in BLM Manual Section 1617.2.)

.5 Relationship of ACEC's to Other Designations The ACEC designation is the principal BLM designation for public lands where special management is required to protect important natural, cultural, and scenic resources and to identify natural hazards. The relationship between ACEC's and the wide range of other public land designations is described below.

.51 Congressional Designations. Congress has reserved the right to approve additions to the National Wilderness System, National Historic/Scenic Trails System, and National Wild and Scenic Rivers System and to congressionally designate public land areas as National Recreation Areas and National Conservation Areas. A potential ACEC may be contained within or overlap one of the above designations provided that the ACEC designation is necessary to protect a resource or value. For example, there are numerous ACEC's within the statutorily-designated California Desert Conservation Area. If, however, the management attention provided under the Congressional designation is adequate to protect a resource or value, it is not necessary or appropriate to designate it as an ACEC.

.52 Secretarial Designations Made By Other Agencies. The Secretary of the Interior is statutorily authorized to designate areas administered by other Interior agencies. Examples Include Critical Habitat Areas (Fish and Wildlife Service), National Historic/Natural Landmarks (National Park Service), National Scenic Areas-(National Park Service), and Man-and-the-Biosphere Reserves (National Park Service). One or more of these designations may have already been made within the planning area prior to initiation of the resource management planning process. Recommendation for such designations may also result from the planning process. A potential ACEC may be contained within or overlap one of the above designations provided that the ACEC designation is necessary to protect the resource or value. In such an event, close coordination with the other agency should be accomplished during preparation of the RMP. If, however, the management attention provided under another agency's designation is adequate to protect the resource or value, it is not necessary or appropriate to designate it an ACEC.

.53 Other BLM Designations And Management Areas.

A. Existing BLM Special Area Designations. Areas previously designated by the BLM under 43 CFR Parts 2070, 8223, and 8352, and authorities other than FLPMA must be reviewed in subsequent RMP's or plan amendments using the procedures identified in this Manual Section. Designations made under previous or archaic regulations and/or expired authorities will remain in effect until they are reviewed during scheduled resource management planning. If such areas are then determined to warrant designation as ACEC's, they should be renamed in accordance with Section 1613.33A.

B. Other Management Areas. The general planning authority of the FLPMA (Section 202) and other specific authorities are the basis of land use allocations which result in the identification of areas for specific purposes. Examples include special recreation management areas, right-of-way corridors, areas recommended suitable/unsuitable for wilderness designation, grazing allotment categories, wild horse herd management areas, off-road vehicle designations, areas designated unsuitable for all or certain types of surface coal mining, and many other determinations set forth in the supplemental program guidance for resource management planning (See Manual Sections 1620-1623). These areas or types of land use allocations should not be confused as designation under the ACEC concept. They may, however, be incorporated into an ACEC or vice versa.

C. Special Management Areas Avoided. Use of the terms "special area" or "special management area" are to be avoided. These terms are relative and have little useful meaning. This is required to avoid ambiguities and to provide an appropriate context to BLM designation of areas requiring special management attention, consistent with designation authority under the FLPMA and the planning regulations (43 CFR 1610.7). The ACEC procedures set forth in this guidance must be used as a basis for future designations of ONA's, RNA's, NHA's, and other areas requiring special management attention in the sense used in the ACEC provisions of FLPMA. (Note: Supplemental program guidance for resource management planning provides for the designation of ONA's, RNA's, and NHA's as ACEC's.)

6 Monitoring and Management of ACEC's. The FLPMA requires the BLM to give priority to the designation and protection of ACEC's. Protection is afforded by implementing management prescriptions set forth in the approved RMP or plan amendment. Follow-up monitoring is also essential for ensuring the protection of ACEC values and resources. General guidance on implementing resource management plans or amendments is set forth in Manual Section 1617.3. General guidance on monitoring is set forth in Manual Section 1616.9. Given the FLPMA mandate that the BLM give priority to the designation and protection of ACEC's, implementation and monitoring of ACEC's is also subject to the following requirements and guidelines.

61 ACEC Implementation Schedules. An implementation schedule must be prepared for each ACEC. Such schedules shall identify the priority, sequence, and costs of implementing activities associated with protection of the ACEC resources or values, including monitoring activities. The schedule may be incorporated into other documents such as an implementation schedule for the entire resource management plan. However, activities associated with the protection of ACEC resources or values must be clearly identified. The ACEC implementation schedule shall be maintained and used as a basis for tracking and reporting on ACEC implementation.

62 ACEC Activity Plans. Site-specific and more detailed activity plans for ACEC's may prepared where circumstances warrant. However, activity plans for ACEC's are not required. The specific RMP requirement to describe in the plan the general

management practices, allowable uses and constraints, including mitigation measures identified to protect the designated ACEC, often negate the need for activity planning. Generally the RMP or plan amendment will identify activity planning needs, if any, in the discussion of the ACEC management prescription. The preparation of such plans is guided by applicable resource program requirements in conformance with management prescriptions of the plan. The resource value(s) associated with the ACEC determines what activity plan guidance applies. If multiple program activities are involved in a particular ACEC, a coordinated or combined activity plan would be prepared (see Manual Section 1619).

.63 ACEC Monitoring. ACEC monitoring is part of the monitoring provision in the RMP. The BLM's planning regulations prescribe that the RMP shall establish intervals and standards for monitoring. The intervals and standards are to be based on the sensitivity of the resources. In the case of ACEC's, the resources are assumed to be sensitive. Therefore, careful monitoring is critical not only to ensure that protection of the identified resource values occurs, but also to keep the managing official aware of how well the RMP provisions are accomplishing their objectives. By so doing, the need, if any, for modification to the RMP will be identified early so that the protection is accomplished and unnecessary measures are not applied. In the case of the ACEC's, it is particularly important that the monitoring measures be systematic and structured so that the managing official is informed on a timely basis of any significant changes in the related plans of other Federal agencies, State or local governments, or Indian tribes. In accordance with 40 CFR 1505.3 (d), the managing official shall, upon request, make available to the public the results of monitoring.

.64 Conformance Determinations and NEPA Compliance. All actions to be conducted or authorized by a BLM official must be in conformance with the provisions of the RMP as defined in 43 CFR 1601.0-5(b). Whenever an ACEC may be affected by the implementation of an authorized or permitted activity, the decision instrument authorizing the specific action must include a description of the special management measures to be applied. An environmental analysis for a proposed action which might affect an ACEC must identify impacts, if any, on the ACEC and must incorporate by reference the pertinent portions of the EIS prepared for the RMP.

.65 Annual Status Report on ACEC'S. Annually the State Director is required to report to the Director (760) on progress in implementing and monitoring ACEC's in order to track accomplishments in managing ACEC's, and to provide an available base of information for responding to Congressional and other inquiries. The report will cover management measures undertaken and completed during the previous fiscal year as well as proposed management measures to be initiated in the next fiscal year. The report, to be provided to the Director (760) by October 15 of each year, must include, as a minimum, the following information for each ACEC: name of the ACEC; size (in hectares and acres); date of designation; identification of applicable land use plan; relevant and important values being protected; implementation actions accomplished during the previous fiscal year; whether or not an activity plan is deemed necessary and, if so, whether or not it has been prepared; and, scheduled implementation measures for the ensuing fiscal year. The report should utilize a tabular format to the extent possible and be organized by District and Resource Area. Its timely submission is critical.

SUPPLEMENTAL PROGRAM GUIDANCE FOR LAND RESOURCES

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Appendices

Memorandum of Understanding between the Bureau of Land Management, Oregon/Washington State Office, and The Nature Conservancy, Oregon and Washington State Offices.

.01 Purpose. This Manual Section provides--basic guidance and information for the management of Research Natural Areas as part of the areas of critical environmental concern program in the States of Oregon and Washington.

.02 objectives. The natural history resource management program responsibilities include identification, designation, and management of natural areas containing important scientific values located on appropriate lands administered by the BLM. The objectives of the Research Natural Area (RNA) program are to:

A. Recognize the scholarly uses of natural history resources.

B. Manage the public lands in a way that ensures attainment of appropriate uses of natural history resources.

C. Protect and preserve designated values that fulfill recognized RNA cell needs for the benefit of scholarly use.

.03 Authority

A. Federal Land Policy and Management Act of 1976 (P.L. 94-579; 90 Stat. 2743· 43 USC 1701) directs the BLM to manage public lands on the basis of multiple use, "in a manner that will protect the quality of scientific,... ecological, (and) environmental.. values... and where appropriate, will preserve and protect certain public lauds in their natural condition." The Act establishes that priority will be given to the designation and protection of areas of critical environmental concern (ACEC) in the development and revision of land use plans. The act also provides for the periodic inventory of public lands and resources, for long-range, comprehensive land use planning, and for enforcement of public land laws and regulations.

B. National Environmental Policy Act of 1969 (P.L. 91-190; 83 Stat. 852; 42 USC 4321) establishes national policy for protection and enhancement of the environment. Part of the function of the Federal Government in protecting the environment is to "preserve important ... natural aspects of our national heritage." The act is implemented by regulations of the Council on Environmental Quality, 40 CFR 1500-1508.

C. Endangered Species Act of 1973 [16 U.S.C. 1531 et seq.; 87 Stat 884; P.L. 93-205, as amended, P.L. 94-359, 90 Stat 913 (1974); P.L 95-212, 92 Stat 3751 (1978) P.L. 96-159(1979) requires all Federal departments and agencies to conserve species, subspecies, or populations of plants and animals officially listed by the Secretary of the Interior or Secretary of Commerce as threatened or endangered. The Act also requires Federal agencies to ensure that the continued existence of listed species is not jeopardized and that designated Critical Habitat of listed species is not destroyed or adversely modified.

D. Executive Order No. 3.1988. Protection of Wetlands.

E. Executive Order No. 11990. Flood plain Management.

.04 Responsibility

A.. State Director is responsible for guiding implementation of the research natural area program, providing technical direction for implementation of the program, and monitoring the progress and quality of work being completed at the field level.

B. District Managers and Area Managers are responsible for directing the identification, designation, and management of Research Natural Areas within their respective areas of authority.

C. Designated Resource Specialists are responsible for ensuring that inventory standards and recommended designations and management prescriptions are in conformance with accepted regional standards with appropriate coordination performed.

D. All personnel are responsible for complying with established management prescriptions in specific designated areas and avoiding inadvertent damage to the key identified natural values.

.05 References

A. Research Natural Area Needs in the Pacific Northwest, USDA Forest Service General Technical Report PNW-38, 1975.

B. Oregon Natural Heritage Plan, Natural Heritage Advisory Council to the State Land Board, March, 1981.

C. State of Washington Natural Heritage Plan, Washington State Department of Natural Resources, 1987.

D. 43 CFR 8223 - Research Natural Areas.

E. BLM Manual 1617.8

.06 Policy

A. Areas established as Research Natural Areas shall be of sufficient number and size to adequately provide for scientific study, research, and demonstration purposes.

B. RNAs will be managed to preserve and protect the key natural attributes for which the area was formally recognized.

C. All RNAs shall be designated ACECs and follow the ACEC designation guidance provided by BLM Manual 1617.8.

D. RNA management plans will normally be developed for each designated area, establishing detailed management objectives and prescriptions unless the degree of specificity is adequate in an RMP or plan amendment.

E. Formal withdrawal of designated areas from mineral entry, except by Congressional action, shall only be pursued in exceptional cases.

.07 Program Relationships

A. Relationship to BLM Programs

a. BLM Planning System. (See Manual Sections 1601 and 1623.3)

a. The designation, protection, management, and use of Research Natural Areas shall be guided by and in accordance with approved BLM land use plans, including but not limited to Resource Management Plans (RMP).

b. The BLM plain shall establish the appropriateness for designation of all potential Research Natural Areas, establish management objectives for those areas designated, consider the extent to which RNA objectives may affect other resource management programs and actions, and take into account the extent to which other potential land and resource uses may have effects on RNA values. The approved land use plan will also provide resource management objectives and include resource uses/allocations which are prohibited or conditionally permitted.

2. Recreation Management Program

   a. Any recreational/educational use of RNAs must be compatible with RNA objectives established through planning.

   b. Where recreational needs conflict with and take precedence over identified potential RNA values, the designation as an outstanding Natural Area should be considered.

   c. Onsite interpretation of RNAs for public education may also satisfy the objective and have the effect of protecting the key scientific values identified in certain cases. The division of funding, staffing, and roles is determined on a case specific basis, between the Recreation Management Program and the other program(s) involved.

3. Other Resource Programs.

   a. BLM resource programs (Forestry, Wildlife, Range, Watershed, etc.) benefitting from the management of RNA values are responsible for providing funds as affected activities.

   b. Other resource program obligations include support of inventory, identification, evaluation, designation, and management functions associated with Research Natural Area values.

B. Relationship to State and Other Federal Agencies. BLM actions are coordinated with other Federal agencies in the Pacific Northwest and the States of Oregon and Washington through participation in the interagency Pacific Northwest RNA Committee.

C. Relationship to Non-Governmental Organizations

1. BLM cooperates with The Nature Conservancy through a Memorandum of Understanding (Appendix A) which recognizes mutually benefitting results of natural area data sharing and special management of adjoining designated properties.

   b. Through privately funded organizations, such as The Native Plant Society of Oregon, BLM receives volunteer assistance and participates on joint identification and protection projects as situations arise.

.3 (See BLM Manual)
.31 through .34 (See BLM Manual)

.35 Establishment of RNA

A. Identification of Potential RNA. Natural areas are normally considered for RNA designation on an ad hoc basis as they are identified by RNA committee members, BLM, and public-at-large, and recommended by letter to the appropriate District Manager.

B. Designation of RNA

1. Designation Process. Designation shall follow the ACEC designation process (see Manual 1617.8).

2. Land User Implications. Designation neither constitutes a formal withdrawal from certain actions, nor does it in itself increase requirements of public land users, except requiring mining plans of operations for operations of less than five acres extent (see 3809.1-4(b)(3)).

3. Recognition of RNA Values. Designation establishes recognition that a RNA has important scientific and educational values and a commitment that utmost importance be paid to the natural feature for which it was designated.

4. Review of Existing Designations. Designated areas will be reviewed during preparation of new RMPs or RMP revisions. The reviews will be conducted by an interdisciplinary team and summarized in the RMP/DEIS, RMP/FEIS and RMP/ROD. Confirmation of designation may include RNA/ACEC boundary adjustments as well as management prescriptions, priorities, and monitoring requirements. Where resource values for which the areas were originally designated are no longer present or better examples satisfying call needs have been located elsewhere, designations are appropriate. Designation will be documented through analysis in the RMP/DEIS and FEIS and decision making in the RMP/ROD.

.36 Management of RNA

A. Planning Process. For each designated RNA, management prescription objectives for each designated RNA that permit natural processes to continue without interference shall be established and implemented through completion of a formal planning document, i.e., RMP, activity plan, or plan amendment.

B. Monitoring. Essential to implementation of management prescriptions is an adequate system of long term monitoring tailored to the specific character of the area to determine if management objectives are being accomplished. A relatively simple, systematic form of baseline sampling should be adopted to document trends and conditions of relevant area characteristics.

C. Compatibility of Other Uses. The appropriateness of various existing and foreseeable potential uses and impacts (including grazing, mineral exploration and development, fire, timber harvest, right-of-ways, public activities and other form of use) shall be addressed and specific conflict resolutions developed by a management plan.

.37 Use of RNA

A. Scientific and Educational. RNAs are established primarily with scientific and educational activities intended as the principal form of resource use for the short and long term. Research proposals should be submitted to the appropriate BLM field office prior to commencing work. Studies involving manipulations of environmental or vegetational characteristics or plant harvest must be BLM approved.

B. Manipulative Use. Because the overriding guideline for management of an RNA is that natural processes are allowed to dominate, deliberate manipulation such as experimental applications, is allowed only on a case specific basis when the actions either simulate natural processes or important information for future management of the RNA is gained.

C. Compatibility of Other Resource Uses. The appropriateness of various existing and foreseeable potential uses shall be addressed and conflict resolutions developed by a management plan.

1. Livestock Grazing and Timber Harvests. Livestock, grazing and timber harvests should be managed within RNAs to promote maintenance of the key characteristics for which the area is recognized. These areas should be identified in a management plans as well as the appropriateness of mitigation measures (such as wind or shading buffers for nearby timber harvest units) for achieving management objectives.

2. Fire Management. Management plans should be coordinated with fire plans for identifying the following objectives:

   a. The need for wildfire protection measures based on the key natural values to be protected (preserving undisturbed, advanced stages of ecological development as opposed to maintenance of a dynamic seral ecosystem) and other relevant factors.

   b. The role of prescribed burns based on the fire history and past vegetative patterns known for the area. Application of prescribed burns normally should closely approximate the 'natural' season of fire, frequency, intensity, and size of burn. The burn should have a carefully designed monitoring plan followed by a fire effects report.

   c. Types of fire fighting, fire hazard reduction, burn site preparation, and post-fire rehabilitation activities appropriate for the area. Scarification for fire breaks or lines and application of retardants should be avoided.

3. Public Uses. Public uses, including recreation, camping, wood cutting, trapping, plant gathering, and ORV use, are generally not compatible with maintenance of key RNA values unless shown not to hinder achievement of specific plan objectives. Education use, such as class field studies are encouraged but repetitive consumptive class activities must have BLM approval. Applications to build roads, pipelines, communication sites, powerlines and similar developments should avoid the designated area.

4. Mineral Exploration and Development. Withdrawal from mineral entry is allowed only when the most outstanding or unique resource values are involved which can tolerate no disturbance. Those areas not closed to location and entry under the mining laws are subject to Surface Management Regulations (43 CFR 3809). Protection from mineral leasing actions through non-surface occupancy stipulations or other measures, may be accomplished through the planning and approval process as provided by mineral leasing regulations and the Bureau planning system. The status of saleable minerals may be addressed through the planning system.'

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SUPPLEMENTAL PROGRAM GUIDANCE FOR LAND RESOURCES
MEMORANDUM OF UNDERSTANDING
between the
BUREAU OF LAND MANAGEMENT
OREGON / WASHINGTON STATE OFFICE
and
THE NATURE CONSERVANCY
OREGON AND WASHINGTON STATE OFFICES

I. PURPOSE

This Memorandum of Understanding is made by and between The Nature Conservancy, hereinafter called the Conservancy, and the Bureau of Land Management, hereinafter called the Bureau. The purpose of this memorandum is to define areas of interest and cooperation as well an describe common objectives related to the identification, protection, and management of natural heritage resources in Oregon and Washington.

II. BACKGROUND

The Bureau, under the laws of Congress and the regulations of the Department of the Interior, is responsible for the management of plants, fish, and wildlife, an wall as for the special protection of federally listed, endangered,, threatened plant and animal species, and other important natural systems and processes.

It in also Bureau policy to ensure that the essential habitats of all Bureau sensitive species (plants and animals) are considered (managed or conserved) in all management decisions to minimize the need for future listing by either Federal or State governments.

The Conservancy is a private, national non-profit organization dedicated to preserving the full array of biological diversity by finding,. protecting and maintaining threatened and endangered species and the best examples of communities and ecosystem in our natural world. The Conservancy owns the world's largest private nature sanctuary system and cooperates with public agencies to identify and protect critical natural areas on public lands.

Due to complementary goals and programs regarding the identification and protection of significant natural heritage resources, the Bureau and the Conservancy have cooperated on many projects in Oregon and Washington. Areas of cooperation have included data collection, exchange and interpretation; land acquisition and exchange; and natural area management plan development and implementation.

III. AUTHORITY

A. FLPMA, Section 307 (PL 94-579, October 21, 1976)

B. Presidential Authority Resolution adopted by the Board of Governors on May 191, 1984.

IV. PROVISIONS

A. The Bureau will:

1. Provide new or updated information on endangered, threatened and Bureau sensitive species, and natural communities, including sightings and inventory information, to the Oregon Natural Heritage Program (ONHP) for incorporation into the ONHP data base.

2. Cooperate with the Washington Department of Resources-Washington Natural Heritage Program (DNR-WNHP) as established by separate agreement.

3. Cooperate with the Conservancy, to facilitate land acquisition or exchange when deemed mutually beneficial.

4. Cooperate with the Conservancy in the inventory and evaluation on Bureau lands of Research Natural Areas, Areas of Critical Environmental Concern, Bureau sensitive species, natural communities, and habitats.

5. Cooperate with the Conservancy to develop and implement management plans for Bureau designated Research Natural Areas, Outstanding Natural Areas and Areas of Critical Environmental Concern, threatened, endangered and sensitive species, habitats and Bureau lands adjacent to Conservancy natural area preserves.

B. The Conservancy will:

1. Incorporate information provided by the Bureau on endangered, threatened, Bureau sensitive species, and natural communities into the ONHP data base, manage the ONHP data base, as funding permits, and provide the Bureau with access to the ONHP data base.
2. Cooperate with the Bureau to facilitate land acquisition or exchange when deemed mutually beneficial.
3. Cooperate with the Bureau in the inventory and evaluation on Bureau Lands of Research Natural Areas, Outstanding Natural Areas, Areas of Critical Environmental Concern, threatened, endangered and sensitive species, natural communities, and habitats. Inventory of Research Natural Areas shall be guided by a current listing of cell needs provided annually to the Bureau.
4. Cooperate with the Bureau to develop and implement management plans for Bureau designated Research Natural Areas, Outstanding Natural Areas, Areas of Critical Environmental Concern, threatened, endangered and sensitive species, habitats, and Bureau lands adjacent to Conservancy natural area preserves.

C. The Bureau and the Conservancy mutually agree:

1. To met annually on or about December 1 to discuss the provisions of this Memorandum of Understanding.
2. That nothing in this agreement shall limit or compromise the policies and authorities of the Bureau or the Conservancy.
3. That nothing in this agreement shall be construed as legally obligating either the Bureau or the Conservancy to the expenditure of funds.
4. That this Memorandum of Understanding shall become effective upon signing by the Bureau and the Conservancy.
5. That amendments to this Memorandum of Understanding may be proposed at any time by either party and shall become effective upon written approval by both parties.
6. That this Memorandum of Understanding shall continue in full force until termination by mutual agreement or by either party. Termination shall require thirty day notice in writing to the other party of the intention to terminate upon a date indicated.
7. That during the performance of this agreement, participants will abide by the terms of Executive Order 11246 on non-discrimination and will take affirmative action to ensure that applicants are employed without regard

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to their race, color, religion, sex, or national origin.

8. That no member or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

Bureau of Land Management
Oregon/Washington State Office
729 NE Oregon Street
Portland, Oregon 97232
(503) 456-2570

The Nature Conservancy
Western Regional Office
785 Market Street
San Francisco, CA 94103
(415) 777-0541

Appendix S-
Noxious Weed EA

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
for the
INTEGRATED WEED MANAGEMENT PLAN
EA OR-110-98-14

FONSI DETERMINATION

On the basis of the information contained in the Integrated Weed Management Plan EnvironmentalAssessment (EA) signed by the District Manager on April 21, 1998, specialists reports, and discussions with interested publics, it is my determination that the proposed action and/or the alternative selected herein, when implemented with the Project Design Features and selected mitigating measures, does not constitute a significant impact affecting the quality of the human environment greater than those impacts previously addressed in the Northwest Area Noxious Weed Control Program EIS (December 1985), Supplement (March 1987), and ROD (May 1987), and the Western Oregon Program-Management of Competing Vegetation FEIS (February 1989), to which this document is tiered, and does not, in and of itself, constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary, and will not be prepared.

Signed:______________ ____________________ Date____________________
District Manager

DECISION RECORD
for the
INTEGRATED WEED MANAGEMENT PLAN
EA OR-110-98-14

DECISION

My decision is to implement the proposed action as described in the EA. No mitigating measures were proposed in addition to those included in the proposed action, except those included by reference. This plan is expected to be useful and viable for the next 5 years.

This decision will be stayed for a period of two weeks ending on June 22, 1998, to allow for a protest period. (43 CFR, Part 4)

DECISION RATIONALE

The decision stated above is consistent with the goals and objectives of the Medford District Resource Management Plan (RMP, June 1995), and the Northwest Area Noxious Weed Control Program EIS and Supplement. Two statutory mandates guide BLM in managing public lands. Section 302(b) of the Federal Land Policy and Management Act of 1976 directs BLM to "take any action necessary to prevent unnecessary or undue degradation of the lands" (43 U. S.C. 1732(b)). Section 2(b)(2) of the Public Rangelands Improvement Act of 1978 adds that BLM will "manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible . . ."(43 U.S.C. 1901 (b)(2)). The impacts created by the above decision do not require further analysis as noted in the FONSI determination.

Signed:______________________________ Date:______________________
District Manager

MEDFORD DISTRICT
Environmental Assessment

Number OR-1 10-98-14
Cover Sheet

Action / Title Integrated Weed Management Plan

Location- Medford District, in portions of Jackson, Josephine, Douglas, Curry, and Coos Counties

Originating Branch: X Operations Division X Forestry

By (signature) ______________________

Writer / Team Leader assigned: Bob Budesa

Reviewer	Assigned Resource Value	Reviewer	Assigned Resource Value
Dave Reed	Forestry Management	Joan Seevers	T & E Plants
Nabil Atalla	Forest Health, Weed Science	Jim McConnell	EA Coordinator
Gerry Capps	Lands/Minerals	Kate Winthrop	Cultural/Historical
Tom Jacobs	Range Management	Ron Labor	Hazardous Materials
Dale Johnson	Fisheries	Julie Wheeler	Safety

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MEDFORD DISTRICT
Integrated Weed Management Plan (IWMP)
and
Environmental Assessment (EA) OR-1 10-98-14 Tiered to the
Northwest Area Noxious Weed Control Program EIS (December 1985)
and Supplement (March 1987)

I. NEED FOR THE PROPOSAL

The Medford District of the Bureau of Land Management proposes to implement an integrated noxious weed control program within the Ashland, Butte Falls, Glendale, and Grants Pass Resource Areas, which lie within portions of Jackson, Josephine, Douglas, Coos, and Curry Counties. Noxious weeds have become established and are rapidly spreading on both public and private rangeland, woodlands, and farm land. Economic and ecological loss from noxious weeds is considerable and runs into the millions of dollars annually in each state in the EIS area, posing a serious menace to the public welfare and the state's economic stability (Northwest Area Noxious Weed Control EIS, 1985, pg 2).

Noxious weeds are also a major threat to the native vegetation of the region. As weeds encroach upon native plant populations, their competitive nature depletes the natives, creating a monoculture or single species landscape. Not only are wildlife forage species threatened, but so too are listed rare and endangered species. These impacts will increase if control measures are not implemented.

This proposal is consistent with the Northwest Area Noxious Weed Control Record of Decision (ROD) for the Final Environmental Impact Statement (EIS), Supplement EIS (FSEIS) dated April 7, 1986 and May 5, 1987 respectively. Copies of the ROD, the EIS, and the FSEIS are available for review at the Medford District Office. This proposal would meet the objectives for active weed control measures as set forth in the Purpose and Need section of the Northwest Area Noxious Weed Control EIS (pg. 2).

In addition, this proposed action is subject to the following land use laws and/or acts: Federal Policy and Management Act (FLPMA), October 1976, Public Rangelands Improvement Act (PRIA), October 1978, Carlson-Foley Act of 1968, Federal Noxious Weed Act of 1974.

Priorities are described for all acreages at the county level, rather than that for BLM lands alone. BLM's program is integrated with other ownerships through the Oregon State Department of Agriculture, which furnishes overall priorities and treatment prescriptions. Weed species on the target list, as well as those on the "A" list are of high concern to the Oregon State Department of Agriculture, and therefore also with the Medford District.

II. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

A. OBJECTIVE OF THE PROGRAM

The objective of the Medford District Noxious Weed Program is to implement the Record of Decision of May of 1987, in accordance with the stipulated priorities for weed control. Those weeds that are known to be established on the public lands within the district are shown on the maps in Appendix 1. The underlying objective of the Medford District Noxious Weed Program is to eliminate or eradicate outlying populations of

Target and "A" listed weeds when and where possible, and to reduce the number of infestations in the remaining area to a lower level, which can be accepted or tolerated by management.

B. PROPOSED ACTION ALTERNATIVE

The proposed action is to implement an Integrated Weed Management Program (IWMP) for all federally managed lands in the Medford District, beginning in 1997 as described in the preferred alternative in the FEIS. This proposed action would emphasize a proactive ecosystem-based approach for control and/or eradication of noxious weeds on all public lands. The long-term goal of this program is to reduce populations of alien plant species by any or all of the means listed below, to a level which will allow for the restoration of native plant species, and provide for overall ecosystem health. These IWM control measures, that may be employed in varying degrees, include cultural or preventative (seed testing, vehicle washing, etc), physical (handpulling, competitive planting, burning, etc), biological (insects, etc.), and chemical (herbicide), and may be found in greater detail in the Northwest Area Noxious Weed Control Program EIS, December 1985. Some factors for determining which method is best suited for use on a particular site can be found in Noxious Weed Strategy for Oregon/Washington, August 1994, Appendix 4, pgs. 29-31. An appropriate combination of methods, including manual, mechanical, biological, and chemical methods would be used to control noxious weed species. Any herbicide use will be in accordance with the program design features outlined on pages 1-7 of the ROD for the FEIS, and those listed in Appendix II of this document. Control actions will be implemented on the basis of the priorities addressed in the Need for the Proposal section of this document.

General features of the weed management treatments, monitoring, and interrelationships with state and local governments are described in pages 1-11 and 14-18 of the EIS, and on pages 2-9 of the 1987 ROD. Close cooperation will be maintained with the Oregon Department of Agriculture, the adjacent National Forests, and the noxious weed coordinators in each of the five counties in which the Medford District resides, to ensure cooperation and coordination in noxious weed control efforts. At this time, the Medford District is working with members of Jackson County to prepare a regional roadside vegetation control plan, a part of which will address noxious weeds.

Noxious weed species, listed by priority, may be found in the Noxious Weed Strategy for Oregon/Washington, August 1994, Appendix 3, pgs. 27-28. The priority categories are as follows:

Priority 1 - Potential New Invaders

Emphasize education of BLM employees and the general public to create an awareness of species which are potential new invaders into southern Oregon. On an annual basis, share information on noxious weed control programs and potential needs with the Oregon State Department of Agriculture and county weed control personnel. Once a population of a priority 1 invader is documented, it will be placed in priority 2 (as it is no longer a "potential" invader, and is actually here), and appropriate action would be taken as described in priority 2.

Priority 2 - Eradication of New Invaders

Emphasize appropriate and prompt action, including appropriate multi-year follow-up action, to eradicate infestations of new invading noxious weeds before they spread to the point where eradication is not possible.

Priority 3 - Established Infestations

Weed species in this category have become established to the extent that eradication is not practical or economically possible. Treatment emphasis would be on containing existing populations and treatment of small, outlying populations. Treatment will also emphasize biological control when effective agents are available. Other control measures may be considered if those measures are practical and cost effective.

Noxious weed control treatment, inventory and monitoring on the public land will be conducted in the following order of priority and zones:

1. Areas adjacent to private agricultural lands, major reservoirs and natural bodies of water, perennial drainways, timber sale units, and BLM and privately owned roads (see Appendix II for water quality/watershed project design features (PDF's)).

2. Major public rights-of-way: Federal, state, and county highways and associated quarries and gravel stockpile sites, railroads, ditches, canals, pipelines, and powerlines.

3. Congressionally Reserved Areas (Rogue Wild and Scenic River, Pacific Crest National Scenic Trail), designated RNA'S, LSR'S, ACEC'S, and WSA'S.

4. Major BLM administrative sites: Developed recreation sites, office / warehouse / storage complexes, and aerial landing strips.

5. All other rights-of-ways, BLM and private roads, reservoirs and springs, perennial drainways, and administrative and recreation sites.

6. All remaining affected public lands.

The type of treatment may be limited on lands containing special Management Area designation, special status (including threatened and endangered) plants or animals, critical wildlife habitat, riparian-wetland areas, and where domestic water may be contaminated or sensitive row crops (organic gardens) damaged.

Only treatment methods that target individuals of noxious weed species will be performed in riparian and wetland areas. Generally, picloram will not be used within these treatment areas. Herbicides approved for aquatic use will be used where appropriate. Mechanical, biological, and manual treatments will be the preferred methods in these areas and their buffers where noxious weeds are present and control is required.

A cultural clearance would be conducted on any proposed treatment area that would require extensive digging or surface disturbance.

The U.S. Fish and Wildlife Service would be consulted for chemical use in proposed treatment areas containing proposed, threatened or endangered plant or animal species.

Chemicals would be applied in strict accordance with EPA approval label instructions.

Program Implementation

The Medford District IWMP would be implemented in accordance with the ROD priorities as follows:

1. Prevention and Detection of Potential New Invaders

Increased and continued efforts will be directed toward training district personnel, adjacent land management personnel (U.S.F.S., S.C.S., O.D.O.T., etc), and public land users to recognize noxious weed species, and the importance of preventing the spread of, and reporting the locations of new invaders. Usually, this is accomplished through forums such as Interagency Noxious Weed Workshops. The Oregon State Department of Agriculture weed specialists, through their contract with the Oregon BLM, will assist in the education effort for priority weeds. The BLM will notify the Oregon Department of Agriculture and local county weed agents of new locations of priority weeds in order to minimize and prevent the spread of noxious weeds. Techniques that could be implemented to accomplish this objective are found in Appendix II.

2. Eradication of New Invaders

The highest priority for treatment after prevention efforts, will be early detection, control and eradication of new invader populations. All methods described in this document, and those described in the EIS, FEIS, and ROD can and may be utilized. The selection of control methods will vary depending on species, as well as location.

As new techniques are developed, evaluations are conducted, or management emphasis changes, additional methods may be utilized. Personnel will continue to be trained and educated on state of the art weed control methods and procedures.

3. Control of Established Infestations

The next highest priority for treatment under the Medford District IWMP will be the containment of large populations, and treatment of outlying populations of established noxious weed species in order to prevent their further spread. Although all acceptable control methods are available, biological control (BC) agents will be the preferred method of treatment. Only those BC agents approved for use in the Medford District may be utilized. Manual, mechanical, and chemical control methods will be the primary methods of control for all outlying weed populations. Table 1 shows the weed species and sites targeted for herbicide application in the Medford District in 1998.

4. New Discoveries

Inventory and monitoring by weed specialists, as. well as program administration by other district personnel, will disclose new populations of previously classified, yet umnapped noxious weed species within the district. These efforts may also detect new noxious weed species not yet mapped or classified. As these sites are discovered and reported, their locations and unique, characteristics will be logged into the district database, including species name, township, range and section, square footage, percent cover, and date of discover or Control actions would then be implemented in accordance with the general control plan and stipulated priorities for each weed in question. The control methods will be governed by site specific conditions, occurrences of threatened or endangered plants and animals, special management areas, proximity to croplands and surface waters, etc. Proper chemical selection for treatment will be governed by the effectiveness of control on the subject weeds, and the potential for impacting the above mentioned site factors / special conditions. All control efforts will be limited to the project design features listed in Appendix 11.

5. Monitoring

See FSEIS, page 122 for Herbicide Application Monitoring Plan. Additional monitoring criteria involving permanent plots or transect plots may be developed. Photographs of treatment sites will be kept in the Medford District Office.

C. NO ACTION ALTERNATIVE

The alternative of no action is not consistent with Federal, state, and county regulations, which mandate active control measures for known and newly discovered noxious weed populations. The no action alternative would also be in direct conflict with the Oregon/ Washington BLM Director's Records of Decision of April 1986 and May 1987. BLM policy relating to integrated weed management has been set forth in Manual Section 9015. However, if the no action alternative were selected, weed management and control actions would be governed by existing documents.

D. ALTERNATIVES CONSIDERED BUT NOT ANALYZED

The alternatives of no aerial herbicide application, no use of herbicides, and no action have been thoroughly analyzed in the Northwest Area Noxious Weed Control Record of Decision (ROD) for the Final Environmental Impact Statement (EIS), Supplement EIS (FSEIS) dated April 7, 1986 and May 5, 1987 respectively. Further discussion in this EA is unnecessary at his time since site specific conclusions and impacts would be essentially the same.

The no aerial herbicide application and no use of herbicides alternatives were analyzed. In the Medford District, the aerial herbicide application method will not be considered for use. Other herbicide application methods as listed in this document as well as in the Northwest Area Noxious Weed Control Environmental Impact Statement (EIS), and Supplement EIS (FSEIS) may be considered depending on weed species and location.

III. AFFECTED ENVIRONMENT

The Medford District is located in the southwest portion of Oregon, and includes approximately 859,100 acres of BLM-administered lands. A general description of the affected environment may be found in the Medford District RMP/EIS, October 1994, starting on page 3-3. More detailed descriptions of lands administered by the Medford District may be found in various watershed analysis documents. Both the Medford District RMP/EIS, and the various watershed analysis plans may be found in the Medford District Office.

The General Location Map (attached) shows the general location of the Medford District, and the area of affected environment covered by the cited planning and environmental documents.

IV. ENVIRONMENTAL CONSEQUENCES

The impacts of the actions described under section II of this document are analyzed in Chapter 3, and summarized in Table 1- 4 (Alternative 1) of the FSEIS. Analysis discussions within the FSEIS have no impacts of importance upon the following resources: topography, utilities, energy and mineral resources, or climate.

No impacts have been identified which exceed those already addressed in the FSEIS and noxious weed control decision referenced in Section I of this assessment. Site specific components of the environment which may be affected as the plan is implemented in the known and mapped treatment areas and new discoveries are as follows:

A. VEGETATION

Terrestrial broad-leafed plants may be mostly affected by the application of 2,4-D, dicamba, glyphosate, and picloram as proposed. These herbicides are non-selective for most broad leafed plants (2,4-D is selective for only broad-leafed plants), and both target species and non target species will be killed where herbicides are applied. Grasses may suffer slightly, but will recover and should increase due to the reduced competition by impacted weeds. The effects of killing non-target species will be inconsequential because only patches and small sites of noxious weeds will be targeted for spraying with ground equipment or hand spray, and the extensive occurrence of native species will largely remain unaffected.

The use of selective herbicides will affect only the area actually sprayed, and only the vegetation that is susceptible to the chemicals used in the area sprayed.

Manual treatments will generally only affect the targeted noxious weeds in the treatment area.

No known potential exists for biological control agents to damage crops, non-target native plant species, or other environmental values. In no instances have insects introduced against an exotic weed in North America become a pest itself or endangered a native plant species (Harris, 1988).

Much of the vegetation along rights-of-ways to be treated has been, and is continually being disturbed as a result of maintenance / use actions, and contains very little of the original native vegetation. Many weed species occupy sites along these roads.

B. SPECIAL STATUS SPECIES

No impacts to special status species (plant or animal) would be expected, since the project design features (PDF's) as outlined in the EIS and FSEIS, as well as those in this document will be implemented and strictly adhered to. These recommendations would be designed to avoid any negative effects to special status species.

C. RIPARIAN, WETLANDS, AND WATERSHEDS

The extent of any impacts to non-target riparian-wetland vegetation would depend on the closeness of desirable species to treated weeds, method and rate of herbicide application, and formulation of herbicide. Because herbicide application rates would be reduced in riparian/wetland areas, and/or herbicides approved for aquatic use would be applied, injury to non-target plants in these areas is expected to be minimal.

The proposed application of herbicides would involve relatively small, widely dispersed areas whose sizes would rarely exceed one (1) acre. Ephemeral stream channels in the upper reaches of watersheds, which range from a couple of feet to several yards wide, would not necessarily be excluded from herbicide application, but may be depending on specific site conditions. In these channels, one of two situations usually apply to preclude the flushing of herbicides downstream in amounts likely to cause impacts: 1) enough rain falls to induce runoff but not enough for the stream-flow to reach the next order stream, or 2) if the stream-flow is great enough to reach the next order stream, enough water flows to dilute the herbicide.

In addition, impacts to other resources due to the amount of overland water flow itself are more likely to cause damage more than the impacts from the herbicide. Larger ephemeral stream channels, typically near or in valley bottoms would be protected by restrictions similar to those that apply to other areas such as riparian zones or wetlands.

Under the proposed action,. significant impacts to surface water quality are unlikely to occur from the normal use of herbicides. In herbicide spraying operations without riparian-wetland restrictions, the amount of herbicide entering the water has been in the parts-per-billion range, and not in the parts-per-million range that appears to be the level for most adverse effects (FSEIS, pgs. 86-87). Since most treatments would be applied not more than one time per year, little potential exists for herbicides to accumulate in harmful amounts.

Along streams and wetlands, ground water is often close to the surface. Depending on the hydraulic head of the aquifer, these areas can be gaining or losing head. If they are losing water to the aquifer, a potential exists for herbicides that are flushed into these areas from overland flow to be introduced into the ground water. Studies have shown the concentration of herbicides in surface flow to be in parts-per-billion, and with the further dilution from entering into the stream or wetlands the concentration would be even lower. Also, streams and wetlands are normally high in microorganisms, the main agents for bio-degradation of herbicides.

No municipal watersheds will be impacted.

D. WILDERNESS STUDY AREAS

It is not anticipated that herbicides will be applied in any wilderness study areas (WSA's). The spraying of poisonous plants is not prohibited under limited circumstances, and it is not unreasonable to expect that noxious weeds might be discovered in these areas and be treated. The impacts of spraying would be consistent with the discussion on page 48 of the FEIS.

E. HUMAN HEALTH

Potential occupational and environmental human health impacts of the proposed action were fully analyzed in the FEIS, and considered in the ROD for the FSEIS. No further analysis is needed in this document.

V. AGENCIES, GROUPS, AND INDIVIDUALS CONSULTED

Oregon Department of Agriculture
Jackson County
Josephine County
Douglas County
Coos County
Curry County

VI. PARTICIPATING BLM EMPLOYEES

Bob Budesa - District Noxious Weed Coordinator, Rangeland Management Specialist
Nabil Atalla - District Forest Health Specialist, Weed Science
Tom Jacobs - District Rangeland Management Specialist
Joan Seevers - District Botanist
Dave Reed - District Forester
Jim Keeton - Human Resource Coordinator
Kate Winthrop - District Archaeologist
Dale Johnson - District Fisheries Biologist
Ron Laber - District Hazardous Materials Specialist
Jim McConnell - District Environmental Coordinator

Appendix II

WATER QUALITY / WATERSHED
PROJECT DESIGN FEATURES FOR NOXIOUS WEED CONTROL

1. Cultural (prevention) activities such as inspection (weed surveys), regulation (Right of Ways), sanitation (wash and clean vehicles) and education will be encouraged and enforced for all high priority multi-use areas, especially those along the Rogue River. Cultural practices include:

   a. Clean all heavy equipment used on BLM-administered lands (including Rights of-Ways) prior to moving onto BLM administered lands. This removes most of the dirt which may contain weed seeds.

   b. Use only certified seed or straw mulch that has been checked for noxious weed seed prior to restoration projects on public lands (Cook 1 99 1).

   c. Reclaim disturbed sites/areas as soon as practical with :
      1) native seed, or if native seed is not available,
      2) a BLM approved seed mixture. Temporary fencing of newly seeded sites within grazing allotments may be required to assure establishment of new seeding. Sites should be rested from grazing for at least two growing seasons after planting.

   d. Monitor all vegetation manipulation and revegetation projects, i.e. prescribed fire areas, timber harvest activities, seeding, and other disturbed sites like rock (material) pits for noxious weed infestations

   e. To reduce areas favorable for potential noxious weed invasion, evaluate sites for vegetative management practices and initiate changes in management in those areas where native or seeded vegetation is in a downward trend.

   f. Limit, restrict or discourage recreational, especially Off Highway Vehicle (OHV) use in weed infested areas.

   g. Require washing of all BLM vehicles at least twice per month in order to reduce the possibility of spreading weed seeds. Washing of vehicles would be expected to increase if vehicles are driven off road through weed infested sites more often.

2. Physical control practices (mechanical) such as mowing, tilling, discing, seedbed preparation, and prescribed burning treatments (because of the possible soil disturbing nature) will require a separate EA, specifically to assess the physical impacts to the land.

3. All manual control practices (hand pulling and hand tools) will be done before seed ripe or seed dispersal, and the plant residue collected as needed for burning (piles) or bagged and removed from site(s). On small isolated sites manual control may be given priority consideration dependent upon weed species and site requirements, before any herbicide application especially, in WSA's-, WA's and ACEC'S.

4. IWM biological control methods such as introduced insects, competitive seeding, pathogens, or livestock grazing will be given consideration district-wide. ODA approved biocontrol agents (insects or pathogens) will be given emphasis for release to control/contain larger infestations where containment is the major goal. The approval for release of beneficial insects or pathogens must complete a Biological Control Agent Release Proposal (BCARP) and Record (BCARR). Only

ODA approved biological control agents will be allowed for release after District and State Office approval.

a. Domestic grazing as a control practice would have to meet specific allotment management resource and grazing objectives and approved District Plans.

b. Competitive seeding using either native or introduced species are subject to a separate site specific analysis if using mechanical seedbed preparation or seeding practices.

c. Those competitive seeding sites less than 5 acres in size using only manual methods of seeding are covered by this document. Seeding these small sites may be permitted after resource area staff review of the same site specific information and/or mitigation stipulations, as required for Pesticide Use Proposals (PUP's) and resource area management approval.

d. The District's use of its approved Biological Control Agents for treatment priorities will be coordinated closely with the ODA to introduce biological control agents to weed populations where site specific criteria meets management goals. Most BLM priority weeds do not have ODA approved biological control agents available for control efforts. All of the insects introduced as biological control have been through a battery of tests to determine their specificity to the target plant. If any insect is known or observed to migrate towards other plants during these tests, they are not introduced to the U.S.

e. The list of currently approved Disrict Biological Control Release Proposals (1993) submitted by ODA for this District under BLM/ODA contract #1422h952-C-22073 are on file with USDA and Oregon State Dept. of Agriculture, and at the Medford District Office.

5. A Special Status and FSEIS Survey and Managed Plant and Animal survey or clearance will be done prior to any treatment.

6. A cultural survey or clearance is required before any soil surface disturbing activity (including Categorical Exclusions) from physical weed control practices (manual, mechanical or prescribed fire) occurs. Physical practices include:

A. Manual control practices (hand pulling and hand grubbing with hand tools such as shovel, hoe, pulaski) are covered by the above mentioned documents.

b. Manual control efforts (hand pulling and hand tools) would be limited to less than 5 acres per infestation site. Control efforts may be permitted after Resource Area staff review of the same site specific information and/or mitigation stipulations as required for Pesticide Use Proposals (PUP's)and Resource Area management approval.

c. Manual control practices may be used immediately, to prevent or reduce establishment of a weed seed source, where newly discovered sites involve just a few plants.

d. Mechanical control practices such as mowing, tilling, discing, plowing or competitive seedbed preparation activities may occur on slopes less than 1 0%.

e. All mechanical control with surface soil disturbing practices, such as mowing, tilling, discing, plowing or competitive seedbed preparation, would require a separate site specific environmental analysis.

f. Fire will be used as a clean up tool for piles of weeds collected for proper disposal under manual or mechanical methods.

g. All prescribed fire activities would be conducted in accordance with BLM's Fire Management Policy (BLM Manual 9210). All prescribed fires would require the preparation of an approved prescribed burn plan before every burn. All prescribed fire over 5 acres in size would require a separate site specific analysis. The burn plan must be approved by the District Fire Management Officer and Resource Area Management. In addition, all required smoke management stipulations or burning permit requirements would be part of the approved prescribed burn plan.

7. All herbicide use will comply with USDI rules and policy, BLM policy and guidelines, Oregon State laws and regulations, Oregon Department of Agriculture (ODA) laws and regulations, Environmental Protection Agency (EPA) , federal pesticide laws (FIRCA), Oregon Department of Environmental Quality (DEQ) regulations, Local County Weed District Priorities and requirements, as well as product label requirements, and in strict accordance with the guidelines established in Managing Competing and Unwanted Vegetation Final Environmental Impact Statement (Nov. 1988).

8. All pesticide (herbicide) applicators are required to submit a Pesticide Use Proposal (PUP) form (Appendix III), which BLM may approve for use of up to 3 years, if same chemical, same target weed, and same area are applicable.

9. All herbicide applications will be applied by a Oregon State licensed and certified applicator.

10. Material Safety Data Sheets (MSDS) for each herbicide being applied will be at each project site with the applicator. Guidelines and information found in "Oregon Pesticide Applicator Manual" (Miller 1993) as updated, will be followed.

11. Areas of known or suspected sensitive amphibians will have as a minimum 100 foot buffer strip from live water for all herbicide applications, with the exception of the use of Rodeo, which is allowed immediately adjacent to water.

12. Herbicide Use Restrictions are as follows:

    a. No vehicle mounted boom sprayers or vehicle mounted handguns will be used within 20 feet of surface (live) water. (Western Oregon Program - Management of Competing Vegetation ROD, pg. 55). All buffer strips will be delineated on the ground by means of flagging or other similarly effective physical delineation.

    b. No vehicle mounted booms will be used in riparian areas where weeds are closely intermingled with trees and shrubs.

    c. Liquid herbicides may be applied (at a height of 0.5 ft to 2.5 ft. above ground) to areas for spot treatments with hand spraying (backpack) equipment (single nozzle, low pressure and volume) to within 10 feet of live water. (Northwest Area Noxious Weed Control Program ROD, pg. 2). Use of mule or horse mounted equipment would also be allowed.

d. Spreader equipment (broadcast) could be used to apply granular formulations applied at a height of about 3.5 feet, to within 10 feet of the high water line of live water.

e. Contact Systemic Herbicides (such as Glyphosate - Rodeo or Accord) may be allowed using hand wipe applications on individual plants up to the existing high waterline. No aerial application of Glyphosate is allowed. (Northwest Area Noxious Weed Control Program ROD, pg. 2).

f. When wind speeds exceed 5 mph, no spray equipment will be used in riparian areas or near water, and no aerial applications are allowed in riparian or wetland areas.

g. No application of herbicides will occur if wind speeds exceed 8 mph, with the exception of hand wipe applications.

h. Only 2,4-D, picloram (Tordon), dicamba, and glyphosate (Rodeo and Accord only) and approved combinations will be allowed as per ROD (1987) from Supplemental FEIS (1987). Acceptable formulations, EPA registration #s, maximum rates of application, and mixture stipulations are referenced from BLM Instruction Memo # OR-91-302 (as updated) and from Table 1-3 p. 9 FEIS (1985).

i. None of the products may be applied within 500 feet of any residence or other place of human occupation unless the occupant or resident gives his/her consent in writing. (Northwest Area Noxious Weed Control Program ROD, pg. 2)

j. All chemicals will be applied only in accordance with Environmental Protection Agency standards specified on the herbicide label, and the stipulations in this EA.

k. Pesticide Use Proposals for herbicide application within boundaries of Wilderness Study Areas (WSA's), Wilderness Areas (WA's), and Research Natural Areas (RNA's) will be reviewed and evaluated by Resource Area staff on a year to year basis. Application of herbicide for second or third year of an approved 3 year PUP is dependent upon effectiveness and Resource Area Management approval.

l. Monitoring pretreatment and post-treatment will be done yearly (pre and post spray applications) on all treated areas.

m. Additional herbicides (if approved) may be used subject to all the above mitigation measures, label restrictions and within limits of ROD or specific approval recommendations.

n. The maximum rates of application for the four approved herbicides are found in Table 3-1 (FEIS 1985); (ai - active ingredients of specific herbicide).

13. The provisions governing BLM's use of herbicides in this program require measures to mitigate possible environmental effects. More mitigation measures are included in the FEIS, the SEIS, and the policy statements and manuals they cite. All are incorporated by reference into this document. The purpose of the

mitigation measures is to ensure the judicious use of the herbicide. The sited represented on the following maps represent all the known sites that have been inventoried thus far, within the Medford District. The noxious weed sites depicted on the following maps do not necessarily represent the sites that will be treated in fiscal year 1998. The sites that may be treated using herbicides are listed by township, range, section, square footage, and acreage towards the end of the document. Any other sites shown on the maps, not listeu for herbicide treatment, may be treated using any or all other methods listed in this document.

Appendix T - LSR Boundary Adjustments

Based on an examination of existing use, operational logistics, habitat quality of lands within and immediately adjacent to the LSR, and the procedural sideboards of the LSR assessment process, the LSR assessment team recommended that the LSR boundary be adjusted in 3 areas. These proposed adjustment areas were given the following names: Southern Slivers, Hyatt Lake, and Section 23. The following is a discussion of each the three areas proposed for adjustment.

Southern Slivers

During the development of the late-successional reserve assessment (LSRA), there was a simultaneous effort under way to correct and refine GIS layers of the land allocations on the Medford District. As a result of this correction and refinement process, the southern boundary of the LSR in the Soda Mountain area was re-mapped. This new map was watershed based as opposed to the timber stand boundary based maps published in the RMP. The new mapping resulted in an apparent loss of 1488 acres from the LSR as mapped in the RMP. However, this new boundary map is considered a correction and not an actual change in land allocation. The lands between the old mapped boundary (RMP) and the newly corrected one are referred to as the "Southern Slivers", and amount to 1488 acres. The LSRA team recommended that the Southern Slivers be added to the LSR.

The following table displays the acreage and distribution of the 6 habitat types present in the Southern Slivers area.

See chapter 2, Wildlife section for habitat type descriptions. This area also includes one spotted owl site.

Hyatt Lake

It was the recommendation of the LSRA team that all BLM land in sections 22 and 15 of Township 39 south, Range 3 east of the Willamette meridian be removed from the LSR.

Table AT-1. **Acres of Habitat Types in Southern Slivers Area Proposed to be added to LSR**

ECOREGION	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TOTALS
SISKIYOU FOOTHILLS	7	3	0	8	3	1	22
SOUTH CASCADE SLOPES	0	19	0	167	89	68	343
KLAMATH RIVER RIDGES	55	136	13	517	352	50	1,123
SOUTH CASCADES	0	0	0	0	0	0	0
TOTAL	62	158	13	692	444	119	1,488

The land in these sections include, or are adjacent to, established recreational developments that receive a lot of use. This use is incompatible with LSR objectives.

Specific disturbances include noise generated by campers and boaters. Fuelwood gathering within and adjacent to the designated recreation area. Heavy snowmobile use in and around the designated recreation area. If the area stays in the LSR, any future development of the recreation facilities would have to be analyzed for conflicts with the LSR objectives. This could present problems for projects like ball field expansion, sewage lagoon expansion, campground expansion etc. As the recreation demands placed on the site increase., such projects are likely to be proposed. Removing the area potentially impacted by these projects from the LSR would greatly simplify the planning process for such projects. Additionally, hazard tree removal is necessary in developed recreation sites and along the associated high use roads. This activity is counterproductive to achieving LSR objectives. Removing the designated recreation area and a reasonable buffer area from the LSR is a logical remedy for dealing with problem of incompatible objectives for the lands in question. See chapter 2, Wildlife section for habitat type descriptions.

Section 23

It was the recommendation of the LSRA team that section 23 in T.39S.,R.4E. be added to the LSR. This section includes a spotted owl site and a designated 100 acre owl core area. This site is part of a cluster of 3 sites in close proximity that are somewhat isolated from other owl sites in the area. The other two sites are in the LSR already. This section also contains the confluence of Jenny Creek and Johnson Creek. Both of these creeks are fish bearing streams and have riparian reserves approaching 400 feet in width on each side of the stream. Part of the Jenny Creek ACEC falls within this section as well. Most of the section is in either type 1 or type 2 habitat. The adjacent private lands have been heavily harvested and Section 23 probably serves as a refugia for late-successional species in an area with very little late-successional habitat. The inclusion of this section to the LSR would add an important, relatively contiguous, block of late-successional habitat to an LSR that is deficient in those habitat types. See chapter 2, Wildlife section for habitat type descriptions.

Table AT-4 displays the distribution and amounts of the 6 habitat types within the LSR in the event that the three boundary adjustments recommended by the LSRA team are made. See chapter 2, Wildlife section for habitat type descriptions.

Table AT-2. Acres of habitat types in Hyatt Lake area proposed for removal from LSR

BOUNDARY ADJUSTMENT AREA	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TOTAL
HYATT LAKE RECREATION AREA (South Cascades Ecoregion)	137	26	80	182	137	0	562
TOTAL	137	26	80	182	137	0	562

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Table AT-3. Acres of habitat types in Section 23, T.39S. R.4E. proposed for addition to LSR

ECOREGION	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TOTAL
SOUTH CASCADE SLOPES	50	361	102	38	34	0	585
SOUTH CASCADES	0	47	15	2	0	0	64
TOTAL	50	408	117	40	34	0	649

Table AT-4. Acres of habitat types by ecoregion based on the 3 recommended proposed boundary adjustments. (Hyatt Lake out, Section 23 in, [illegible] in.)

ECOREGION	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TOTAL
SISKIYOU FOOTHILLS	949	2,115	416	1530	711	58	5,779
SOUTH CASCADE SLOPES	145	823	250	3,779	855	328	6,176
KLAMATH RIVER RIDGES	508	1,257	1,222	5,971	3,237	219	12,418
SOUTH CASCADES	1,443	3,580	1,348	752	2,407	191	9,721
TOTAL	3,045	7,775	3,236	12,032	7,210	796	34,094

Appendix U. -
Box-O Ranch Water Temperature Data

North Boundary

			FLOW	TEMP (F.)			TURB	SKY	PRECIP
DATE	TIME	GAGE	(CFS)	AIR	H20	COND	(NTU)	CONDITION	CONDITION
07/17/74	1155	m	m	76.0	63.0	m	m	m	m
06/20/91	1520	1.26	21.70	m	59.0	m	m	m	m
07/02/91	1340	m	m	90.0	75.0	170.0	1.60	CLR	NONE
07/31/91	1440	0.84	5.90	82.0	73.0	220.0	0.90	m	m
08/14/91	14100.78	4.50	84.0	70.0	260.0	0.70	CLR		NONE
08/28/91	14400.79	4.70	66.0	61.0	265.0	0.50	CLDY		LT RAIN
09/10/91	1250	0.84	5.90	70.0	59.0	260.0	0.90	m	m
09/24/91	1515	0.75	3.80	87.0	60.0	260.0	0.60	CLR	NONE
10/08/91	m	m	m	M	57.0	m	m	m	m
10/09/91	1144	0.84	5.90	74.0	52.0	215.0	1.30	CLR	NONE
10/22/91	M	0.83	5.70	44.0	50.0	m	m	m	m
10/23/91	1150	0.85	6.10	45.0	46.0	255.0	0.80	P CLDY	RAIN/SNOW
11/07/91	1035	0.83	5.70	58.0	48.0	265.0	0.70	CLR	NONE
11/20/91	1430	1.21	18.30	44.0	42.0	220.0	2.60	CLDY	RAIN ON SNOW
12/04/91	1240	1.05	11.00	44.0	35.0	210.0	1.30	CLR	NONE
12/18/91	1509	1.48	44.20	35.0	38.0	150.0	19.00	CLDY	SNOW SHWRS
12/20/91	1030	1.28	23.00	35.0	32.0	175.0	7.20	CLR	NONE
12/31/91	950	1.08	12.00	29.0	32.0	200.0	2.80	CL	NONE
01/15/92	1000	1.10	12.70	34.0	34.0	205.0	2.10	HIOVRCST	NONE
01/23/92	1117	1.24	20.30	40.0	34.0	m	m	m	m
01/29/92	0945	1.40	33.10	38.0	35.0	150.0	12.00	CLR	NONE
02/11/92	1112	1.28	23.00	50.0	43.0	165.0	4.80	CLDY	LT SHWRS
02/18/92	1126	1.36	28.50	54.0	42.0	150.0	8.20	m	m
02/27/92	1300	1.50	47.00	73.0	44.0	130.0	7.60	CLR	NONE
3/11/92	950	1.30	24.30	50.0	41.0	145.0	3.90	m	m
03/24/92	1215	1.38	30.30	66.0	50.0	150.0	4.50	m	m
03/25/92	1010	1.30	34.30	57.0	46.0	150.0	3.60	P CLDY	NONE
04/08/92	1200	1.11	13.00	54.0	48.0	170.0	1.80	CLDY	LT RAIN
04/21/92	1215	1.30	34.30	56.0	56.0	m	m	m	m
04/22/92	1210	1.27	22.30	47.0	50.0	155.0	3.70	m	m
04/30/92	1330	m	m	59.0	58.0	m	M	CLR	NONE
05/06/92	1300	1.03	10.30	81.0	64.0	205.0	1.30	CLR	NONE
05/21/92	1050	0.92	7.70	64.0	55.0	230.0	1.00	CLR	NONE
05/26/92	1127	0.70	2.60	64.0	68.0	m	m	m	m
06/03/92	1210	0.64	1.60	80.0	73.0	270.0	1.50	CLR	NONE
06/17/92	1005	0.72	3.10	64.0	58.0	278.0	1.20	CLR	NONE
06/22/92	1110	0.68	2.30	94.0	78.0	290.0	1.30	P CLDY	NONE
06/23/92	1542	0.68	2.30	85.0	79.0	m	m	CLDY	NONE
07/01/92	1455	0.80	5.00	70.0	64.0	290.0	1.40	M CLDY	NONE
07/16/92	1120	0.66	1.90	86.0	m	m	m	CLR	NONE
07/29/92	0940	0.62	1.20	68.0	67.0	318.0	0.80	CLR	NONE
07/30/92	1105	0.65	1.80	93.0	73.0	m	M	CLR	NONE
08/12/92	0925	0.64	1.60	70.0	67.0	330.0	1.00	CLDY	NONE
08/26/92	1230	0.68	2.30	84.0	64.0	322.0	0.50	CLR	NONE
08/27/92	1433	0.67	2.10	88.0	69.0	m	m	CLR	NONE
09/09/92	1000	0.73	3.30	66.0	56.0	290.0	0.70	CLR	NONE
09/23/92	1235	0.73	3.30	76.0	60.0	292.0	0.60	P CLDY	NONE
10/01/92	1100	0.77	4.30	67.0	57.0	m	m	P CLDY	NONE
10/07/92	1155	0.84	5.90	72.0	49.0	302.0	0.50	CLR	NONE
10/21/92	0930	0.94	8.20	52.0	48.0	282.0	0.60	P CLDY	SHWRS
11/04/92	1125	0.95	8.40	50.0	45.0	260.0	1.00	CLDY	NONE
11/18/92	1040	0.92	7.70	m	m	288.0	0.50	HI OVRCST	NONE
12/16/92	1010	1.24	20.30	29.0	32.0	222.0	1.70	CLDY	NONE
01/05/93	1220	1.16	15.00	42.0	33.0	228.0	1.50	P CLDY	NONE
03/09/93	1140	2.78	229.00	43.0	38.0	79.0	10.50	CLR	NONE
03/16/93	1110	3.48	495.00	47.0	40.0	72.0	11.00	CLDY	RAIN
03/17/93	1255	4.14	817.00	53.0	40.5	61.0	24.00	CLDY	SHWRS
03/23/93	1345	3.65	590.00	46.0	44.0	63.0	12.00	CLDY	SHWRS

North Boundary

DATE	TIME	GAGE	FLOW (CFS)	TEMP (F)		COND	TURB (NTU)	SKY CONDITION	PRECIP CONDITION
				AIR	H20				
04/07/93	1140	2.77	225.00	55.0	45.0	71.0	3.70	P CLDY	NONE
05/11/93	m	m	m	m	m	85.0	2.60	m	m
05/20/93	1250	1.98	75.00	67.0	59.0	93.0	2.10	P CLDY	NONE
06/02/93	1515	2.28	118.00	60.0	57.0	90.0	4.50	P CLDY	NONE
06/14/93	1425	1.90	67.00	80.5	62.0	m	m	m	m
07/14/93	1450	1.16	14.40	64.0	61.0	168.0	0.74	CLDY	NONE
08/10/93	M	0.98	8.30	74.5	60.0	218.0	0.54	m	m
08/25/93	1425	0.97	8.10	71.0	63.0	209.0	0.66	CLR	NONE
09/21/93	1230	0.95	7.50	69.5	54.0	301.0	0.55	CLR	NONE
10/06/93	1145	1.04	10.10	63.0	55.0	286.0	0.74	CLDY	DRZL
10/07/93	m	m	m	m	m	288.0	0.69	m	m
11/05/93	1200	1.05	10.50	56.0	39.0	273.0	0.63	CLR	NONE
12/01/93	1135	1.06	11.50	40.0	36.0	258.0	1.00	CLDY	RAIN
12/07/93	1210	1.25	17.50	42.0	39.0	239.0	1.63	CLDY	RAIN
12/22/93	1130	FRZN	m	m	m	m	M	CLR	NONE
01/11/94	1050	1.40	21.40	38.0	37.0	194.0	5.57	M CLDY	NONE
01/25/94	927	1.61	37.80	34.0	34.0	164.0	10.30	P CLDY	NONE
02/24/94	1035	1.41	21.90	48.0	39.0	197.0	6.46	CLDY	NONE
02/28/94	1410	1.89	65.90	58.0	43.0	135.1	12.80	P CLDY	NONE
03/16/94	1430	1.50	26.80	51.0	44.0	165.3	3.85	CLR	NONE
04/12/94	1315	1.44	23.40	60.5	51.5	162.0	3.35	m	m
05/05/94	1255	1.27	18.00	66.0	57.5	204.0	1.91	P CLDY	NONE
05/09/94	1310	1.28	18.30	81.0	64.0	191.2	1.89	m	m
06/09/94	1040	1.01	9.10	70.0	58.0	263.0	0.92	m	m
07/20/94	1115	0.88	2.80	92.0	72.0	295.0	1.07	CLR	NONE
07/27/94	1300	.89	3.50						
08/24/94	1045	.88	2.80	75.0	62.0	305.0	0.78	SMOKE	NONE
09/01/94	1114	.88	2.80	71.0	62.5	343.0	0.75	CLR	NONE
11/22/94	1212	30	18.80	35.0	33.3	312.0	2.30	CLR	NONE
12/14/94	1325	21	16.20	41.0	33.0	276.0	0.93	CLDY	NONE
12/28/94	1040	43	22.90	35.0	36.0	190.8	4.03	P C	
01/12/95	1330	3.05	332.00	45.0	39.0	86.7	16.90	P CLDY	NONE
01/26/95	1356	1.90	67.00	36.5	34.5	100.2	9.25	CLDY	DRZL
02/01/95	1155	4.06	773.00	50.5	40.0	66.3	28.80	CLDY	SWRS
02/15/95	1005	2.09	m	34.0	33.0	92.8	4.30	CLR	NONE
02/28/95	1210	2.24	m	65.0	46.0	62.0	3.86	CLR	NONE
04/06/95	1105	2.48	m	51.0	48.0	80.2	3.52	CLDY	NONE
04/26/95	1325	2.52	m	67.0	58.0	92.5	3.13	CLDY	NONE
05/11/95	1324	2.60	m	48.0	52.0	91.7	3.28	P CLDY	SHWRS
06/12/95	1300	2.60	m	m	m	139.2	2.12	m	m
06/27/95	1330	1.48	m	89.0	68.0	159.0	1.78	CLR	NONE
06/28/95	1403	1.46	m	84.0	67.5	162.3	2.89	CLR	NONE
08/17/95	1443	1.11	m	m	m	221.0	1.21	CLR	NONE

South Boundary

DATE	TIME	GAGE	FLOW (CFS)	TEMP (F.) AIR	H2O	COND	TURB (NTU)	SKY CONDITION	PRECIP CONDITION
07/16/74	1405		80.0	71.0		m	m	m	m
07/12/91	1300		M	75.5		m	M	CLR	NONE
07/12/91	1240		86.0	74.0		m	m	CLR	NONE
07/16/91	1045		60.0	66.0		215.0	1.70	RAIN	RAIN
07/31/91	1240		79.0	70.0		225.0	0.90	m	m
08/14/91	1230		80.0	67.0		270.0	0.60	CLEAR	NONE
08/20/91	m		86.0	73.0		m	m	m	m
08/28/91	1145		65.0	60.5		270.0	0.70	CLDY	LT RAIN
09/10/91	1030		64.0	55.0		275.0	0.60	m	m
10/09/91	955		57.0	40.0		225.0	0.90	CLR	NONE
10/23/91	1015		43.0	43.0		260.0	1.50	P CLDY	RAIN/SNOW SHWRS
11/20/91	1340		45.0	42.0		235.0	2.00	CLDY	RAIN ON SNOW
02/27/92	1220		68.0	46.0		630.0	7.30	CLR	NONE
04/30/92	1122		54.0	53.5		m	m	CLR	NONE
05/06/92	1415		90.0	76.0		200.0	1.30	CLR	NONE
05/21/92	1015		61.0	53.0		230.0	1.20	CLR	NONE
06/03/92	1025		77.0	64.0		295.0	1.60	CLR	NONE
06/17/92	1215		76.0	64.0		295.0	1.20	CLR	NONE
06/23/92	1320		94.0	78.5		m	m	CLR	NONE
07/01/92	1310		67.0	65.5		287.0	1.40	M CLDY	NONE
07/29/92	1145		88.0	69.0		348.0	0.90	CLR	NONE
08/13/92	1150		99.0	73.0		m	M	CLR	NONE
08/26/92	945		69.0	56.5		352.0	0.50	CLR	NONE
09/15/92	m		73.0	60.0		302.0	1.20	P CLDY	NONE
09/23/92	1145		71.0	56.0		313.0	0.90	P CLDY	NONE
10/01/92	1245		69.0	59.0		m	m	P CLDY	NONE
03/17/93	1400		54.0	42.0		63.0	24.90	CLDY	SHWRS
04/21/93	1530		60.0	52.0		m	m	m	m
05/05/93	1445		68.5	55.5		79.0	2.90	CLR	NONE
05/20/93	1150		62.5	58.5		92.0	2.00	P CLDY	NONE
06/02/93	1310		57.0	56.0		95.0	4.70	P CLDY	NONE
07/14/93	1410		62.5	67.0		169.0	0.68	CLDY	NONE
08/25/93	1320		72.5	63.0		191.0	0.64	CLR	NONE
10/06/93	1330		62.0	57.5		285.0	0.82	CLDY	DRZL
05/05/94	1410		65.0	60.0		204.0	1.43	P CLDY	SHWRS
07/20/94	1219		95.0	77.0		299.0	1.15	CLR	NONE
11/22/94	1325		39.2	32.0		315.0	1.12	CLR	NONE
06/27/95	1420		89.0	73.0		159.0	1.98	CLR	NONE

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Table AU-1. Jenny Creek at Box-O Ranch North Boundary
Summer 1991 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	Aug	Sept	Oct
Days of complete data	—	10	31	31	30	8
Average Daily Maximum (F.)	—	65.1	75.5	72.5	64.4	58.6
Average Daily Minimum (F.)	—	57.	64.2	63.3	56.1	52.0
Average Daily Mean (F.)	—	—	—	—	—	—
Average Diurnal Fluctuation (F.)	—	7.9	11.3	9.2	8.3	6.6
Days with Maximums<60 F.	—	—	—	—	3	7
Days with Maximums 60-65 F.	—	5	2	18	1	—
Days with Maximums 65-70 F.	—	5	1	6	5	—
Days with Maximums >70 F.	—	—	30	23	4	—

The hottest 7-day period centered on: 05-July
Highest 7-day Average Maximum: 77.8

	02- July	03- July	04- July	05- July	06- July	07- July	08- July
Maximum	77.4	79.0	79.7	77.0	77.0	77.0	77.4
Minimum	63.7	66.6	69.3	[illegible]	65.5	64.6	65.3
Mean	—	—	—	[illegible]	—	—	—
Diurnal Fluctuation	13.7	12.4	10.4	9.0	11.5	12.4	12.1

Table AU-2. Jenny Creek at Box-O Ranch South Boundary
Summer 1991 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	Aug	Sept	Oct
Days of complete data	--	--	19	31	30	8
Average Daily Maximum (F.)	--	--	79.4	77.2	69.1	62.9
Average Daily Minimum (F.)	--	--	63.9	62.5	55.1	50.8
Average Daily Mean (F.)	--	--	--	--	--	--
Average Diurnal Fluctuation (F.)	--	--	15.5	14.7	13.9	12.2
Days with Maximums<60 F.	--	--	--	--	--	--
Days with Maximums 60-65 F.	--	--	--	1	4	7
Days with Maximums 65-70 F.	--	--	1	1	16	1
Days with Maximums >70 F.	--	--	18	29	10	--

The hottest 7-day period centered on: 30- July
Highest 7-day Average Maximum: 81.1

	27- July	28-July	29- July	30- July	31- July	01- Aug	02- Aug
Maximum	81.7	82.4	81.3	81.5	80.9	80.0	80.0
Minimum	63.5	64.9	65.1	64.0	64.6	62.9.	62.6
Mean	--	--	--	--	--	--	--
Diurnal Fluctuation	18.2	17.5	16.2	17.5	16.4	17.1	17.5

Table AU-3. Jenny Creek at Box-O Ranch North Boundary
Summer 1992 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	Aug	Sept	Oct
Days of complete data	30	23	--	--	--	--
Average Daily Maximum (F.)	69.1	72.2	--	--	--	--
Average Daily Minimum (F.)	56.4	60.6	--	--	--	--
Average Daily Mean (F.)	--	--	--	--	--	--
Average Diurnal Fluctuation (F.)	12.7	11.6	--	--	--	--
Days with Maximums<60 F.	--	1	--	--	--	--
Days with Maximums 60-65 F.	2	2	--	--	--	--
Days with Maximums 65-70 F.	17	3	--	--	--	--
Days with Maximums >70 F.	11	17	--	--	--	--

The hottest 7-day period centered on: 03- July
Highest 7-day Average Maximum: 74.7

	31- May	01- June	02- June	03- June	04- June	5- June	06- June
Maximum	75.2	76.6	71.8	76.3	76.3	74.3	72.5
Minimum	62.4	62.2	64.4	62.9	62.2	61.7	59.7
Mean	--	--	--	--	--	--	--
Diurnal Fluctuation	12.8	14.4	7.4	13.3	14.0	12.6	12.8

Table AU-4. Jenny Creek at Box-O Ranch South Boundary Summer 1992 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	Aug	Sept	Oct
Days of complete data	30	30	31	31	30	1
Average Daily Maximum (F.)	74.4	76.9	76.7	76.7	65.3	62.2
Average Daily Minimum (F.)	58.1	62.9	64.5	64.0	54.6	51.8
Average Daily Mean (F.)	--	--	--	--	--	--
Average Diurnal Fluctuation (F.)	16.3	14.0	14.2	12.7	10.7	10.4
Days with Maximums<60 F.	--	--	--	--	--	--
Days with Maximums 60-65 F.	--	1	1	--	14	1
Days with Maximums 65-70 F.	3	3	1	2	15	--
Days with Maximums >70 F.	27	26	29	29	1	--

The hottest 7-day period centered on: 30- July
Highest 7-day Average Maximum: 82.2

	27- July	28- July	29- July	30- July	31- July	01- Aug	02- Aug
Maximum	82.0	82.2	82.6	82.2	83.1	82.6	80.8
Minimum	66.6	67.5	67.8	66.2	68.4	69.3	67.8
Mean	--	--	--	--	--	--	--
Diurnal Fluctuation	15.5	14.8	14.8	16.0	14.8	13.3	13.0

Table AU-5. Jenny Creek at Box-O Ranch North Boundary
Summer 1993 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	Aug	Sept	Oct
Days of complete data	--	28	31	31	30	4
Average Daily Maximum (F)	--	63.2	68.2	69.3	61.9	58.3
Average Daily Minimum (F)	--	52.8	55.3	56.2	50.3	49.4
Average Daily Mean (F)	--	57.8	61.2	62.5	56.3	53.9
Average Diurnal Fluctuation (F)	--	10.4	12.9	13.1	11.6	8.9
Days with Maximums <60 F	--	9	1	--	17	4
Days with Maximums 60-65 F	--	6	3	5	2	--
Days with Maximums 65-70 F	--	10	18	13	9	--
Days with Maximums >70 F	--	3	9	13	2	--

The hottest 7-day period centered on: 04- August
Highest 7-day Average Maximum: 75.5

	01- Aug	02- Aug	03-Aug	04- Aug	05- Aug	06- Aug	07- Aug
Maximum	73.8	75.9	76.5	77.5	75.6	75.9	73.6
Minimum	57.9	60.1	61.2	63.5	61.0	62.1	60.1
Mean	65.7	67.7	68.8	70.2	68.2	68.5	66.7
Diurnal Fluctuation	15.8	15.8	15.3	14.0	14.6	13.9	13.5

Table AU-6. Jenny Creek at Box-O Ranch South Boundary
Summer 1993 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	Aug	Sept	Oct
Days of complete data	26	30	31	31	6	--
Average Daily Maximum (F.)	61.3	65.1	72.2	73.6	74.5	--
Average Daily Minimum (F.)	52.0	53.8	56.7	58.7	58.4	--
Average Daily Mean (F.)	56.1	58.9	63.7	65.7	66.3	--
Average Diurnal Fluctuation (F.)	9.3	11.3	15.5	14.9	16.1	--
Days with Maximums<60 F.	9	9	--	--	--	--
Days with Maximums 60-65 F.	13	4	1	1	--	--
Days with Maximums 65-70 F.	4	11	5	8	--	--
Days with Maximums >70 F.	--	6	25	22	6	--

The hottest 7-day period centered on:
Highest 7-day Average Maximum:

	01- Aug	02- Aug	03- Aug	04- Aug	05- Aug	06- Aug	07- Aug
Maximum	79.7	81.5	80.6	82.4	80.6	80.6	77.9
Minimum	60.8	62.6	64.4	67.1	64.4	65.3	63.5
Mean	69.3	71.6	72.5	74.2	72.2	72.2	70.6
Diurnal Fluctuation	18.9	18.9	16.2	15.3	16.2	15.3	14.4

Table AU-7. Jenny Creek at Box-O Ranch North Boundary
Summer 1994 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	Aug	Sept	Oct
Days of complete data	26	30	31	31	30	14
Average Daily Maximum (F.)	59.5	64.0	69.6	66.6	59.9	51.8
Average Daily Minimum (F.)	53.7	58.4	64.8	61.8	56.5	49.0
Average Daily Mean (F.)	56.6	61.4	67.4	64.5	58.4	50.6
Average Diurnal Fluctuation (F.)	5.8	5.7	4.8	4.8	3.4	2.8
Days with Maximums<60 F.	12	4	--	--	19	14
Days with Maximums 60-65 F.	14	13	--	8	11	--
Days with Maximums 65-70 F.	--	13	20	23	--	--
Days with Maximums >70 F.	--	--	11	--	--	--

The hottest 7-day period centered on: 20- July
Highest 7-day Average Maximum: 72.0

	17- July	18- July	19- July	20- July	21- July	22- July	23- July
Maximum	72.1	71.6	72.1	72.0	72.5	72.0	71.6
Minimum	66.9	66.2	66.2	68.0	69.1	69.3	67.5
Mean	69.5	69.1	69.4	70.2	71.0	70.6	69.6
Diurnal Fluctuation	5.2	5.4	5.9	4.0	3.4	2.7	4.1

Table AU-8. Jenny Creek at Box-O Ranch South Boundary
Summer 1994 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	Aug	Sept	Oct
Days of complete data	26	30	31	31	30	14
Average Daily Maximum (F.)	69.4	76.4	82.0	77.1	68.9	57.7
Average Daily Minimum (F.)	53.2	57.5	63.8	60.6	55.2	46.1
Average Daily Mean (F.)	60.1	66.1	71.8	68.2	61.6	51.6
Average Diurnal Fluctuation (F.)	16.2	18.8	18.3	16.5	13.7	11.5
Days with Maximums<60 F.	2	--	--	--	--	12
Days with Maximums 60-65 F.	5	1	--	--	5	1
Days with Maximums 65-70 F.	6	1	--	--	13	1
Days with Maximums >70 F.	13	28	31	31	12	--

The hottest 7-day period centered on: 20- July
Highest 7-day Average Maximum: 84.2

	17- July	18- July	19- July	20- July	21- July	22- July	23- July
Maximum	83.3	83.3	85.1	86.9	85.1	81.5	84.2
Minimum	67.1	65.3	66.2	68.0	69.8	69.8	67.1
Mean	74.3	73.4	74.3	77.0	77.0	74.3	75.2
Diurnal Fluctuation	16.2	18.0	18.9	18.9	15.3	11.7	17.1

Table AU-9. Jenny Creek at Box-O Ranch North Boundary
Summer 1995 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	Aug	Sept	Oct
Days of complete data	--	16	31	31	30	9
Average Daily Maximum (F.)	--	63.5	68.5	67.1	61.7	51.6
Average Daily Minimum (F.)	--	54.3	5931	57.0	54.0	45.6
Average Daily Mean (F.)	--	58.8	63.7	62.1	58.1	48.8
Average Diurnal Fluctuation (F.)	--	9.3	9.4	10.1	7.7	6.1
Days with Maximums<60 F.	--	6	--	--	6	9
Days with Maximums 60-65 F.	--	2	5	10	24	--
Days with Maximums 65-70 F.	--	4	18	15	--	--
Days with Maximums >70 F.	--	4	8	6	--	--

The hottest 7-day period centered on: 04- August
Highest 7-day Average Maximum: 71.9

	01- Aug	02- Aug	03- Aug	04- Aug	05- Aug	06- Aug	07- Aug
Maximum	70.7	71.6	72.0	73.4	73.9	72.7	68.9
Minimum	58.3	60.4	61.5	61.9	64.0	62.1	62.6
Mean	64.3	66.0	66.6	67.5	69.0	67.6	65.3
Diurnal Fluctuation	12.4	11.2	10.4	11.5	9.9	10.6	6.3

Table AU-10. Jenny Creek at Box-O South Ranch Boundary
Summer 1995 Stream Temperature Monitoring

Monthly Statistics

	May	June	July	August	Sept	Oct
Days of complete data	--	16	31	31	30	9
Average Daily Maximum (F.)	--	67.7	74.7	74.3	68.1	56.5
Average Daily Minimum (F.)	--	54.9	59.5	57.5	54.2	44.0
Average Daily Mean (F.)	--	60.7	66.5	65.6	61.2	50.1
Average Diurnal Fluctuation (F.)	--	12.8	15.2	16.8	13.9	12.5
Days with Maximums< 60 F.	--	5	--	--	2	7
Days with Maximums 60-65 F.	--	1	1	--	4	2
Days with Maximums 65-70 F.	--	2	4	2	13	--
Days with Maximums >70 F.	--	8	26	29	11	--

The hottest 7-day period centered on: 03- August
Highest 7-day Average Maximum: 79.9

	31- July	01 Aug	02- Aug	03- Aug	04- Aug	05- Aug	06- Aug
Maximum	76.8	78.8	79.9	80.1	82.0	82.0	80.1
Minimum	55.4	59.4	61.7	62.6	63.1	66.0	63.3
Mean	65.7	68.6	70.4	70.8	72.0	73.6	71.7
Diurnal Fluctuation	21.4	19.4	18.0	17.5	18.9	16.0	16.7

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Cascade Siskiyou Ecological Emphasis Area

Existing Environment

R 2 E
R 3 E
R 4 E
T 39 S
T 39 S
Dead Indian Road
Table Mountain
Cottonwood
Hyatt Prairie Road
Willow Creek
Howard Prairie Lake
Creek
Road
Hyatt Reservoir
Prairie
Little Hyatt Reservoir
Little Chinquapin Mountain
Chinquapin Mountain
Emigrant Lake
Songer Butte
Buck Point
GREEN SPRINGS
99
66
Hyatt Road
Little Hyatt
East Hyatt

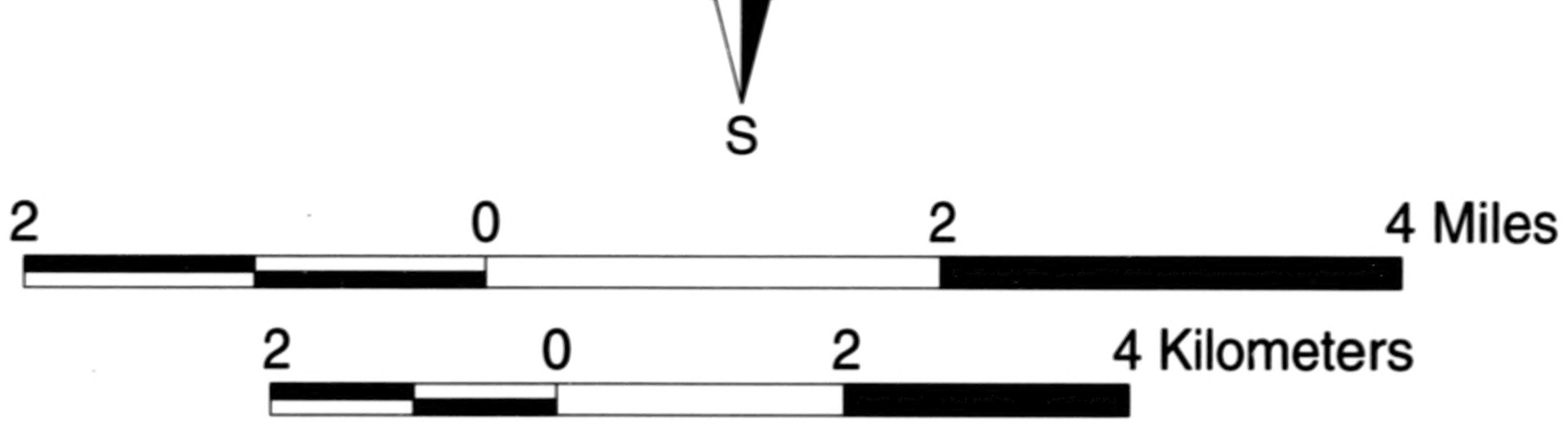
T
40
S

Songer Butte
Buck Point
GREEN SPRINGS
HIGHWAY
66
East Hyatt
Hyatt Road
Buckhorn Springs Road
Tyler Creek
Pinehurst
Mountain View
Mountain View Airport
Lincoln
Parsnip Lakes
Buck Rock
Steinman
Old Siskiyou Highway
Neil
Slide
Hobart
Hobart Peak
South Fork
Keene
Copco Road
Mount Ashland Ski Road
Siskiyou
Little Pilot Rock
Soda Mountain
Porcupine
Colestine
Rosebud Mountain
5

T
40
S

T 41 S
T 41 S
T 48
T 48
OREGON
CALIFORNIA
Colestine
Colestine Road
Old Siskiyou Highway
Porcupine
Porcupine Mountain
Little Pilot Rock
Soda Mountain
Pilot Rock
Scotch Creek
Slide Creek
Jenny Creek
Fall Creek
Road
Hilt
Copco

T 48 N
T 48 N
R 7 W
R 6 W
R 5 W
R 4 W
Hilt
Copco
Daggett Mountain
Little Pilot
Creek
N
W
E
S
2
0
2
4 Miles
LEGEND
Bureau of Land Management
Matrix
Late Successional Reserve
District Defined Reserve
U.S. Forest Service
State of California
Private
Box-O Ranch
Horseshoe Ranch
In the Process of BLM Aquisition
Existing CSEEA Area
Analysis Area
Interstate Highway



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2000

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lzowada: usr3/workarea/lzowada/cseeanew/map2big.aml

- ■ District Defined Reserve
- ☐ U.S. Forest Service
- ☐ State of California
- ☐ Private
- ░ Wilderness Study Area
- ▨ Mariposa Botanical Unit
- ☐ Jenny Creek ACEC
- ░ Research Natural Area Oregon Gulch and Scotch Creek
- ░ Pilot Rock ACEC

- ■ In the Process of BLM Aquisition
- — Existing CSEEA Area
- — Analysis Area
- 5 Interstate Highway
- 66 State Highway
- — Inventoried Road
- — Non-Inventoried Road
- ┈ Pacific Crest Trail
- Stream
- Ditch

PLATE 1

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